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AMERICAN COUNCIL, INSTITUTE OF PACIFIC RELATIONS

1795 CALIFORNIA STREET
SAN FRANCISCO

129 EAST 52ND STREET
NEW YORK

316 DILLINGHAM BLDG.
HONOLULU

NORTH PACIFIC FISHERIES

WITH SPECIAL REFERENCE TO ALASKA SALMON

by

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STUDIES OF THE PACIFIC NO. 3

AMERICAN COUNCIL
INSTITUTE OF PACIFIC RELATIONS

SAN FRANCISCO

NEW YORK

HONOLULU

1939

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PRINTED BY HADDON CRAFTSMEN, INC., IN U. S. A.

FOREWORD

THE SWIFT technical advance of modern civilization is operating to increase possibilities of international friction. Control of food supplies, either for purposes of direct consumption or to derive the economic benefits which have accrued from such control with the development of world-wide marketing, has before now set armies marching. It is only of recent years, however, that technological improvements have thrown open the fisheries along the coast of one country to the possibilities of exploitation by vessels of another nation thousands of miles away.

The world has moved, moreover, into a period in which alarming reductions can be observed in many sources of raw material supply formerly considered inexhaustible. New uses, improved methods of preservation, increased speed and efficiency of transportation have stepped up demand for many products, and responding technique has raised to devastating efficiency the methods of stripping the lands and seas of their wealth. Conservation of what still exists, rehabilitation of what has been depleted, is now in order if mankind is not to suffer irremediably in the future. Fisheries throughout the world are objects for protection against too great exhaustion. Exposure to additional exploitation from nations not hitherto concerned therewith complicates an already difficult problem. Such is the situation of the salmon fisheries of the American Northwest.

The world supply of canned salmon comes from the fish which spawn in the rivers flowing into the northern Pacific. The greater part of the supply comes from the Alaska fisheries, operated by American interests and conserved by the United States government. Salmon fisheries of less importance are found in the coast states and in Canada's British Columbia on this side of the ocean, and in Japan and the Soviet Union on the other. By treaty arrangement Japan has an interest in the salmon fishing in Soviet waters, and the Canadian and United States interests overlap in the fish which pass through Puget Sound up the Fraser River

of Canada. For some time, then, salmon has constituted a matter of international concern to each pair of these countries separated by the Pacific. Now the problem has been extended by the development of the floating cannery with the possibility it provides of catching and canning the fish at sea without putting into port until the processed cargo is finally unloaded. Technological developments, in other words, have now opened the fisheries on the North American side of the Pacific to possible exploitation by the nationals of countries on the other shore. The Japanese Diet in 1936 authorized expenditures for scientific investigation of the possibilities of salmon deep-sea fishing in Bristol Bay off the coast of Alaska, causing alarm among the American circles having interests in the Alaska fisheries. Similar concern developed in 1937 over the proposal of a British concern, subsequently abandoned, to fish the Pacific halibut banks now exclusively exploited by American and Canadian fishermen.

Under such circumstances fisheries were drawn within the scope of study of the Institute of Pacific Relations, presenting as they do a problem of international adjustment. The Institute therefore decided to inaugurate research work in this field on an international scale, and authorized its American Council to proceed with a study of the Pacific salmon fisheries of Northwest America. This American investigation has been divided into two sections: the present volume, which describes and evaluates the stake of the United States and Canada in the salmon fisheries, and a second study undertaken by Stefan Riesenfeld, under the direction of Joseph Walter Bingham, which deals with international law and state practice as regards the control of maritime fisheries. In addition, the Japanese and Soviet Councils of the Institute are conducting studies of the fisheries of their respective countries in the Pacific.

As regards North American fisheries, the international problem was rendered more acute in the summer of 1937 when reports from Bristol Bay told of actual operations in the salmon fisheries by Japanese vessels with a resultant intensification of alarm among American interests. Subsequent diplomatic conversations between the United States and Japan resulted in assurances from *Japan that, without prejudice to the question of Japanese legal rights in the matter, the latter country would suspend its three-*

year survey of these fisheries and would continue its policy of refusing to issue licenses to Japanese vessels for salmon fishing in the Bristol Bay area. While apparently removing the immediate difficulties, the American-Japanese discussions have not permanently disposed of the issue to the mutual satisfaction of both parties. In addition, similar issues have cropped up as economic and political problems in other areas of the Pacific.

In the future of the salmon fisheries a fundamental international issue is at stake: the preservation of a food resource which requires conservation measures to offset depletion by unwise exploitation facilitated by advancing technique. Difficult enough when only the nationals of one country are concerned, the problem becomes even more so when nationals of other lands, not hitherto concerned with the fisheries in question, desire to embark as newcomers upon the exploitation of marine resources. Advancing technique is bound to raise many such issues in the future. The aim of the present study and of that which will be published later is to present a realistic and scientific analysis of the problem as it has developed in one important quarter of the globe.

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June 15, 1939.

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PREFACE

THIS STUDY was undertaken as a part of the international research program of the Institute of Pacific Relations, with the cooperation of the International Research Committee and the American Council. Acknowledgment is also made to the University of Washington for its generous cooperation in furnishing financial aid, providing facilities, and in supplying staff assistance in certain statistical matters.

In securing source data for the study actual contacts with the leaders and experts of the industry were of prime importance. Personal interviews were held with fishermen, cannery operatives, union officials, executives, bankers and government experts. Especially valuable as sources of information were the administrators and experts of the United States Bureau of Fisheries and the International Fisheries Commission, as well as officers in the associations of packers, boat owners and labor unions affiliated with the salmon industries. Access was had to the account records of a number of typical concerns which provided useful financial data. The study has been made possible only by the generous way in which all concerned in the industry have facilitated the collection of information and given freely of their time and counsel.

The authors wish to express their gratitude especially to Dr. Carl L. Alsberg, Director of the Giannini Foundation of Agricultural Economics of the University of California and Research Chairman of the American Council, Institute of Pacific Relations; Dr. Ernest D. Clark, of the Association of Pacific Fisheries; Dr. F. A. Davidson and Mr. Seton H. Thompson of the United States Bureau of Fisheries; Dr. W. F. Thompson, Director of Investigation, International Fisheries Commission and International Pacific Salmon Fisheries Commission; Mr. Edward W. Allen, member of both Commissions and Chairman of the former; Mr. Henry P. Melnikow, Director of the Pacific Coast Labor Bureau of San Francisco; Mr. Benjamin H. Kizer, Chairman of the Washington State Planning Council; Dr. R. W. Clough, Chemist and Assistant Director of the National Canners Associa-

tion, and Professor Donald H. Wallace, of Harvard University, for their valuable advice and suggestions.

The authors wish to express their particular indebtedness to Mr. William W. Lockwood, Research Secretary of the American Council, for his tireless assistance in editing and preparing the manuscript for publication, and also to colleagues at the University of Washington, especially the late Professor Shirley J. Coon, of the Department of Economics, who offered valuable suggestions and read parts of the manuscript. Sincere appreciation for their technical assistance in preparing the manuscript for publication must also be expressed to Miss Joy Hume, Miss Helen Wiss and Mrs. Annette Blumenthal, of the American Council staff.

Finally, especial mention should be made of Mr. Miller Freeman, publisher of *Pacific Fisherman*, former member of the International Fisheries Commission and member of the Washington State Planning Council, for it was largely as a result of his initiative and support that this study was undertaken.

HOMER E. GREGORY
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June, 1939.

NORTH PACIFIC FISHERIES

I

FISHERY QUESTIONS

EVENTS OF far-reaching importance have recently attracted attention to the fishing industry of the northwestern section of the American continent. Citizens of the United States and Canada, more particularly those residing on the Pacific coast, have become aware that the fisheries which are so integral a part of the region's economy are exposed to penetration by nationals of other countries, and are hence a potential source of international friction. Attention has been focussed primarily on the salmon fishery of Alaska where Japanese interests have sought an opportunity to operate. The possible exploitation of the northwestern halibut fishery by European interests has also aroused concern, however, and it is clear that the problem is Pacific-wide, and even world-wide, in its scope.

Inherent in the situation is the conflict of national interests which has made fisheries throughout the world a subject for dispute ever since man expanded his fishing activity beyond the rivers and coastline of the country in which he lived. Moreover, alien exploitation of the salmon and halibut fisheries, if it should develop freely, would present a serious question as regards the conservation of fish resources. Recognition of the need to prevent exhaustion of supply is comparatively recent, and the technique for rehabilitation of a depleted fishery is only in process of development. At present the United States and Canada operate the fisheries in question under strict conservation regulations. Were nationals of other countries to exploit the fisheries, the effectiveness of the existing regulations would be jeopardized.

The present study, it is hoped, will serve to give a general picture of this problem and to advance an understanding of some of its important components. The principal emphasis is placed on the salmon industry of Alaska and the Pacific Northwest, and especially the former, since it is this industry which has been most directly faced with the possible intrusion of foreign fishing in-

terests. The salmon industry far overshadows the other fishing industries of the Pacific coast, whether in terms of investment, employment opportunity or food supply. Indeed, canned salmon, which absorbs about 75 per cent of the total salmon catch, exceeds in annual value all other edible canned fish products of the United States and Alaska put together. Moreover, Alaska accounts for more than 90 per cent of the American pack. It is the weight of national interest in this branch of economy which needs to be assessed. Alien exploitation of the Alaska salmon runs, however, has future implications not only for the Alaska salmon industries but also for the industrial structures based on the fisheries of British Columbia and the coastal states. To these also attention has been directed though to lesser degree.

Of the other north Pacific fisheries, halibut has been chosen for discussion primarily because of its significance as an example of conservation work which uncontrolled fishing could summarily nullify. Brief mention is also made of other fisheries which would inevitably be affected if the labor and investment opportunities afforded by the salmon reserves were contracted. The major part of the discussion is devoted to the American industries rather than to the Canadian, inasmuch as the United States has considerably larger interests involved and has been more directly concerned with the international aspects of the situation.

A study of the salmon industry begins logically with a description of its physical setting—the biological factors which have conditioned its development, the fishing techniques and the processing methods which provide the framework for its structure. It is these basic features which account for the standardization of processes, the scale of operations, the types of business organization and the production and marketing arrangements which characterize the industry.

With this introduction to the industry, we shall proceed at once to an analysis of the historical trend in the supply of fish—that is, the fundamental issue of conservation. Inherent in this question is the history of regulatory policies and procedures which have sought to perpetuate the fish reserves by controlling the intensity of their exploitation and by preserving as far as possible the natural surroundings of the fishery. Effective conservation work calls for the elimination of jurisdictional conflicts

between the regions concerned and for a high degree of cooperation between various factors in the industry and the governmental authority instigating and enforcing the protective regulations. To what extent has this fishery resource now been stabilized as a permanent component of the national wealth?

Of particular importance also in determining what identity may exist between national interest and the interest of the salmon canning industry is an analysis of business structure and practices. Examination of production and marketing will reveal to what extent monopolistic tendencies exist; while exploration of financial and managerial problems and of the possibilities for control of fixed gear and plant sites indicate what comparative advantages the industry affords to the large concern as against the small. To what extent does competition exist despite the dominance of a few large companies in production and marketing? Are there conditions which tend to limit development of large-scale concerns? What is the role of the small independent producer? The history of combinations in the industry throws valuable light on these issues.

Also germane to the question of public interest in the industry is a consideration of prices, profits and costs. No intensive study has been possible within the limits of this volume. Data are presented, however, on price structures and price behavior which indicate the degree of price rigidity or "stickiness" which is to be found. The information gathered on profits and costs is also valuable as casting additional light on various problems encountered by the salmon canners. Investment data show the property stake in fishing and processing, and give further insight into the differences between the large and small packers.

Labor's stake in this industry also calls for analysis. To how many individuals does it provide employment? What are the conditions of work and the returns thereon? What are the outstanding facts as regards the sources from which this labor is drawn, the number of months for which employment is afforded, the racial types, and the proportion of skilled to unskilled workers? The extent of unionization also requires examination because of its effects upon wages and conditions of work, the problems which it presents in labor relations and the possibility it

affords for joint action in warding off any threat to the livelihood of workers.

In terms of the national economy, some attention must be given to the degree to which salmon production represents both a food supply for the public and an item in foreign trade. In terms of regional economy, considerable emphasis must also be placed on the interrelationship of the industry with the whole economic development of Alaska. The employment it affords Alaska residents, the stimulus or support it provides to other industries, its contribution to the finances of the Territory—all are of value in determining the American stake in the salmon industry. In this connection one may not overlook the important part played by Seattle, San Francisco and other coastal cities in the financing, outfitting and marketing operations of the industry.

The halibut fishery supports a simpler industrial structure than does the salmon and affords more limited opportunities as regards investment, employment and food supply. As already stated, however, it is an important instance of conservation technique, probably the most important in the world. The historical process of depletion by nationals of the United States and Canada is matched only by the success achieved to date in rehabilitation of the fishery by the work of the International Fisheries Commission. The stake in halibut is largely dependent on this conservation.

This survey of the fisheries in their various aspects concludes with a résumé of the international implications. Why are the nationals of other countries interested in these fisheries? What are the techniques by which access to these distant sources of supply has become possible? The events of the last few years are briefly chronicled, and the question is posed as to their ultimate solution. This question enters the realm of international law,¹ but in its determination the weight of national interest will inevitably play its part. It is the object of this study to aid in evaluating the interests at stake in the fisheries of the Northwest.

¹ An exhaustive study of international law and state practice respecting maritime fisheries, by Joseph Walter Bingham and Stefan Riesenfeld, is in progress under the auspices of the American Council, Institute of Pacific Relations.

II

THE PHYSICAL SETTING OF THE SALMON FISHERIES

THE DEVELOPMENT of the salmon industry has been basically conditioned by the character and location of its raw material supply. Fishing operations, types of governmental regulation, the number and size of processing plants, the scope of employment and investment opportunities, market organization—all are directly related to physical attributes of the salmon themselves. Moreover, variations in the fish supply are an important factor in creating disequilibrium in the industry and raise special questions of business and public policy.

The Pacific salmon¹ is found on both sides of the ocean, ranging as far south as Japan on the Asiatic coast and Monterey Bay on the American. On the latter side of the Pacific the salmon runs occur in the rivers of California, Oregon, Washington, British Columbia and Alaska, appearing as far north as the Arctic Ocean. The American runs are considerably greater than the Asiatic; indeed, Alaska has the world's greatest salmon reserve. It now accounts for about 60 per cent of the Pacific salmon pack (see Fig. 1), which is virtually identical with the world pack. The amount of canned Atlantic salmon is negligible.

Salmon have a well developed homing instinct which brings them back to spawn in the waters of the river system in which they were hatched. They are an anadromous fish, spending the greater part of their lives in the ocean but ascending rivers to breed—a fact which naturally centers fishing activity along the shore. Moreover, Pacific salmon as distinct from the Atlantic genus spawn only once and then die. As the spawning period

¹ For greater detail than is provided here the reader is referred to John N. Cobb, *Pacific Salmon Fisheries*, U. S. Dept. of Commerce, Bureau of Fisheries, Fisheries Document no. 1092 (Washington, 1930). This work contains a wealth of material from which much of what follows in this chapter has been drawn.

NORTH PACIFIC FISHERIES

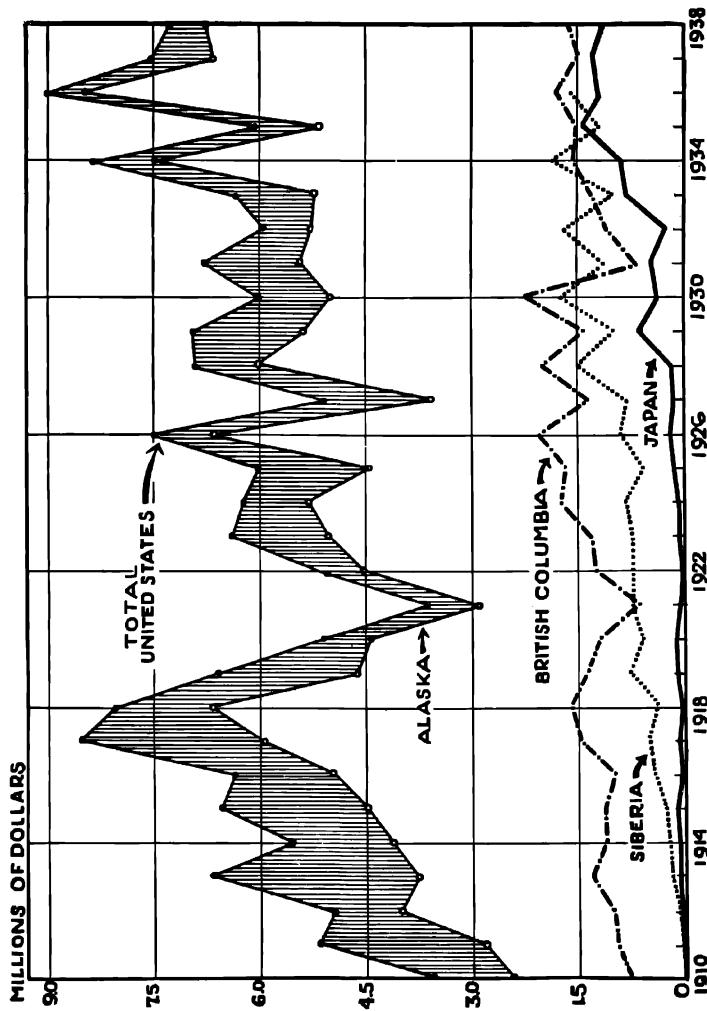


Fig. 1. *World Production of Canned Pacific Salmon, 1910-38.*

Source: *Pacific Fisherman*, 1939 Yearbook, p. 87. The Siberia pack includes the output of Soviet and Japanese canneries. Comparable data are not available after 1936. The Japan pack includes the output of Japanese domestic canneries as well as that of floating canneries in non-Japanese waters.

approaches, the fish head toward their home streams, gather in large schools, and rise to the surface in the shallower waters. The number of salmon which pass up any river to the spawning beds thus largely determines the size of the run in that particular location a few years hence. Conservation, therefore, yields a direct return in the area where it is applied.

To be in prime condition as food the salmon should be caught before they enter fresh water on their trip upstream. Once in fresh water they stop feeding and gradually deteriorate in quality. The fish have stored within themselves at sea sufficient strength to reach their spawning grounds. Delayed too long or forced to spend too much energy on the trip upstream, they die before the journey and the cycle of reproduction are completed. These physical characteristics of the salmon have had pronounced influence on the gear used in the fisheries and on conservation practices.

The geographical dispersion of the salmon fishing grounds from California to the Bering Sea has naturally conditioned the form of the industry. It has led to the building of a large number of processing plants among which canneries predominate. The perishability of the raw fish supply, moreover, coupled with the absence of cheap refrigeration necessary for long-distance shipping, has tended to maintain unaltered from early years the basic industrial structure. Even though the cannery process is mechanized the salmon industry is essentially a small-scale industry in its production operations. The recent introduction of more rapid transportation methods has tended to increase somewhat the scale of operations, however, and fish supplies are now carried from broader fishing areas to larger processing plants.

As the fish can usually be caught only when heading toward the spawning grounds the industry is highly seasonal. This has a marked effect upon employment, capital needs and the marketing system. Moreover, the isolation of many of the fishing areas in Alaska whence the greater part of the salmon catch is obtained, together with the small population in that area, has necessitated the yearly importation from the states of thousands of workers and of the major part of the supplies necessary for operations. The outfitting, employment and financial centers for the industry

are on the coast, at Seattle and to a lesser extent in San Francisco. These are also the storage and marketing centers from which the product finds its way by rail and water to the domestic markets, and in lesser amount to overseas countries as well.

The Pacific coast, then, has become the base of the largest salmon industry in the world, with Alaska as the principal source of supply and the Puget Sound area as the primary organizing center. Here has been built up a great industrial structure, involving many thousands of workers and millions of dollars in investment. Here also are being developed conservation techniques which represent a pioneer effort in the upbuilding of depleted natural resources. For an understanding of the entire picture some grasp of the characteristics of the salmon and of fishing and canning processes is essential. Accordingly, we begin our analysis at this point, leaving for later chapters the elaboration of certain aspects of the industry touched upon briefly here.

PACIFIC SALMON SPECIES

The 1937 salmon catch of the United States and Alaska amounted to 689,073,000 pounds, valued at \$17,310,000.² This put it in second place as regards volume and in first place as regards value among the various American fisheries. The 1937 pilchard catch of 1,139,505,000 pounds exceeded salmon in volume but the value of the raw product of this fishery took only third place with \$6,814,833. Tuna ranked second in value of catch with \$9,110,000, haddock was fourth according to 1937 figures with \$4,248,107, and halibut fifth with \$3,365,308.³

On the Pacific coast the value of the salmon catch, \$17,304,000, is even more significant as it represents considerably more than one third of the total fish catch of the Pacific states and Alaska. The importance of Alaska as a salmon reserve has already been referred to. The salmon catch of the Territory in 1937 was more

² U. S. Dept. of Commerce, Bureau of Fisheries, *Statistical Bulletins*, nos. 1285, 1328, 1930. This includes Atlantic salmon amounting to 28,600 pounds valued at \$6,289.

³ *Ibid.* Also *Statistical Bulletins*, nos. 1311, 1315, 1318, 1326. This ranking does not consider shellfish, etc., of which all varieties taken together came to \$25,480,000 in 1937.

than 6 times that of the states in volume, in 1936 it was more than 10 times that of the states, and even in 1935—a poor year for Alaska—it amounted to four fifths of the total salmon poundage of the United States.⁴ The values which have been given are those of the raw fish and are naturally much less than those of the finished product. The total estimated value of all American salmon products in 1937 was between 55 and 60 million dollars, far in excess of any other category of fishery products.

The British Columbia salmon catch in 1937 was 169,173,600 pounds, or slightly less than one quarter of that of the American Pacific areas. The value of salmon products marketed in the same year was \$11,907,905 as compared with \$16,155,439 for all the marketed fish products of the province.⁵ Salmon thus accounts for three quarters of the British Columbia total. The value of the salmon in marketed form is also considerably greater than that of any other Canadian fishery and places British Columbia in the position of the leading province of the Dominion as regards value of fishery products. The total output of the Canadian fisheries in 1937 was \$38,976,000.⁶

Five species of Pacific salmon compose the American and Canadian catch: king, chinook or spring salmon (*Oncorhynchus tshawytscha*); red, sockeye or blueback (*O. nerka*); coho, silver, silverside or medium red (*O. kisutch*); pink or humpback (*O. gorbuscha*); chum or keta (*O. keta*). Not included in the catch total is a lesser-used fish, steelhead trout (*Salmo gairdneri*), properly belonging to the genus of the Atlantic salmon but commonly

⁴ The United States Pacific salmon catch was as follows for the three years 1935-37:

	Volume (in '000 lbs.)			Value (in '000 dollars)		
	1935	1936	1937	1935	1936	1937
Alaska.....	434,004	726,853	593,384	6,970	11,857	11,876
Washington.....	67,008	37,427	63,652	2,827	1,944	3,199
Oregon.....	26,786	21,582	25,101	1,492	1,403	1,700
California.....	5,657	5,022	6,908	347	361	329

Source: R. H. Fiedler, *Fishery Industries of the United States* (annual), 1936-37, U. S. Dept. of Commerce, Bureau of Fisheries (Washington) for 1935-36 figures; 1937 figures from *Statistical Bulletins*, cited, nos. 1285, 1328.

⁵ Canada, Dept. of Trade and Commerce, *Census of Industry, Advance Report on the Fisheries of British Columbia, 1937* (Ottawa, 1938), pp. 4, 7.

⁶ *Ibid.*, p. 17.

classed with the salmon of the Pacific coast. In 1937, the American catch of these different species was as follows:⁷

	Volume (in thousands of pounds)	Value (in thousands of dollars)
King.....	57,027	3,416
Red.....	200,501	6,195
Coho.....	31,908	1,250
Pink.....	307,709	5,253
Chum.....	91,900	1,189
Steelhead.....	2,087	124
	<hr/> 691,132	<hr/> 17,427

The species vary in their characteristics and in the localities where they are to be found. Some knowledge concerning these differences is essential to an understanding of the discussion which follows.

As the above table reveals, the *king* is the most valuable of the salmon species in terms of value per pound. It is also the largest, its average weight being about 22 pounds, with extreme weights in excess of 100 pounds. The flesh of the fish is usually a deep salmon red, although in some localities it is white and occasionally parti-colored. This was the first species to be canned. The color of the fish so conditioned consumers to red salmon that it was a long while before fish with paler flesh such as pinks, chums or steelheads achieved any popularity in the canned-salmon market.

The *king* has also more fat content than the other species and its food value is the highest of any. Today the species is canned in lesser degree than the other four salmon and, as the choicest of the fish, is most in demand in the fresh and frozen trade. It is also mild-cured, the large size of the individual fish being of value here. It is caught throughout the whole coastal region from California to Alaska, with the greatest commercial concentration on the Columbia River. Some streams have three distinct runs each year as in the case of the Columbia; others have only one. The chinook matures in its fourth, fifth, sixth or seventh year, with the females normally being four-year fish. The young migrate to sea shortly after hatching or after they have spent a year in fresh water.

The *red salmon* is a smaller fish with an average weight of five

⁷ *Statistical Bulletins*, cited, nos. 1285, 1328.

to six pounds. As the name indicates its flesh is red, and next to the chinook it commands the highest price of all canned salmon. The fish is plentiful throughout British Columbia and several parts of Alaska, but the most productive runs at present are in Bristol Bay, north of the Alaska Peninsula. The most southerly area in which this species runs in any quantity is the Columbia River. It is the Fraser River of British Columbia, however, which has been most famous for the size of its sockeye runs. The fish matures in either the fourth or fifth year, and like the king may go to sea as soon as it has hatched or in its second year. One peculiarity of the red salmon is that as a rule the streams up which it runs are those which originate in lakes. The catch of red salmon, unlike the chinook, is used almost exclusively for canning.

The *coho salmon* averages about 7 pounds in weight, with a maximum of 30 pounds. It is found as far south as Monterey, California, and appears in most of the rivers up the coast and in Alaska. The flesh is a somewhat lighter red than that of the sockeye and commands a lower price. Runs of this fish occur from July to November. Coho mature usually in the third year, with the young fish going to salt water in the first or second year. Only a part of the catch of this species is used for canning, the major portion being used in the fresh- and cured-fish trade.

Pink salmon is the most abundant of all species, although its per unit value is lower than that of the other three described. The flesh is pale pink in color and has a lower oil content than the king, red or coho. It has an average weight of about 4 pounds with an 11-pound maximum. Its life cycle is only a two-year one, the young passing out to the sea soon after they are hatched. The fish is rarely found south of Puget Sound, where fair runs occur although only in alternate years. Southeastern Alaska is the region where pinks are found in greatest abundance, the run beginning in June in some districts and continuing until September.

The *chum* is the least valuable of all salmon species when canned. It averages 8 pounds in weight, while the maximum size attained is 16 pounds. The color of its flesh is light yellow. Found in most of the coastal rivers, its runs are concentrated in the region from Puget Sound to southeastern Alaska. The runs occur late in the season, continuing in some localities until the middle

of November. This species reaches maturity in its third, fourth or fifth year. The young migrate as soon as they are free-swimming. This fish is especially good for freezing, salting and smoking.

Steelhead resembles the Atlantic salmon in that it does not necessarily die after one spawning, as do the Pacific coast salmon species. Its average weight varies from 8 to 15 pounds, while in extreme cases it may reach 45 pounds. Its flesh is light colored and is little used as a canned product, but is excellent for use in fresh or frozen form. It is found as far south as Carmel River, California, and ranges north to Alaska. In the latter region, however, it is seldom caught.

As will appear in the next chapter, the various salmon species came into popular use in canned form at different times. It was not until the period following 1911 that all of the five main species were utilized on a large scale. With the growing demand for canned food occasioned by the World War years, pink and chum salmon came into wide use. The part each species has played in the growth of the total North American salmon pack is portrayed in Fig. 3, p. 42.

UTILIZATION OF THE SALMON CATCH

The total estimated value of all salmon products on the Pacific coast in 1937 was approximately \$70 millions. Alaska produced \$46,573,928, British Columbia \$11,907,905, Puget Sound \$3,094,274 in canned salmon, and the Columbia River area \$5,437,294. Other data are not available, save that Puget Sound provided 7,866,800 pounds frozen and processed by methods other than canning.

The salmon industry is primarily a canning industry. According to a recent study made by the United States Tariff Commission, about three quarters of the salmon caught are put up in cans.⁸ More precisely, about 77 per cent were utilized by the canning industry, 19 per cent were consumed fresh, and 3 per cent (part of which were later smoked) went into the salting process. Freezing accounts for two per cent, of which a portion was further processed into kippered salmon. In addition, a certain

⁸ U. S. Tariff Commission, *Report to the United States Senate on Salmon and Other Fish*, Report no. 121, 2nd series (Washington, 1937), fig. facing p. 28.

amount of the fish is also dried, principally by Alaska natives. Some salmon roe is put up for caviar and there is a small amount of processing waste from the canneries for meal and oil. Salmon is also used for bait and fox feed to a limited extent. The Bureau of Fisheries has been conducting research into ways and means of assisting the salmon industry toward more profitable utilization of salmon cannery trimmings, but the industry has so far given the matter little attention since it seems to offer only slender hope of profit.

Table 1 shows the amount and value of the United States salmon catch in the various forms in which it is processed for the years 1935-37.

Table 1. *Output of Manufactured Salmon Products in the United States, 1935-37*

Salmon Product	Quantity			Value		
	1935	1936	1937	1935	1936	1937
Canned (48-lb. cases)	6,037,890	8,965,177	7,555,037	32,475	50,061	52,934
Frozen (1,000 lbs.) ¹	18,861	13,216	17,224	1	1	1
Mild-cured (1,000 lbs.) ²	10,571	11,550	5,722	2,148	2,245	1,064
Smoked (1,000 lbs.) ³	8,882	8,753	10,324	2,674	2,656	3,114
Kippered (1,000 lbs.) ³	2,321	2,705	1,849 ⁴	479	542	402 ⁴
Pickled (1,000 lbs.)...	896	873	765	95	97	101
Dried (1,000 lbs.)....	1,436	1,442	1,148	115	58	80
Dry-salted (1,000 lbs.)	87	30	12	10	4	2
Caviar (1,000 lbs.) ⁵ ...	304	121	274	36	11	30
Meal (tons).....	1,109	1,657	1,608	31	55	49
Oil (1,000 gals.).....	135	146	167	54	59	94
Canned eggs for food and bait (48-lb. cases).....	4,856	5,141	6,943	97	105	121

¹ Figures not available.

² Usually an intermediate product. It may also be shown in its final stage of processing elsewhere in the table.

³ Represents a combination of data of various years between 1931 and 1936, according to Fiedler.

⁴ In addition there was a production of 157 standard cases (7,536 pounds) of canned kippered salmon which was valued at \$1,794.

⁵ This item appears again in canned salmon eggs for food.

Source: 1935 and 1936 figures are compiled from R. H. Fiedler, *Fishery Industries of the United States* (annual), 1936-37, U. S. Dept. of Commerce, Bureau of Fisheries (Washington); 1937 figures obtained from U. S. Dept. of Commerce.

The 1937 British Columbia salmon catch of 169,173,600 pounds was marketed as follows:⁶

⁶ *Advance Report on the Fisheries of British Columbia, 1937*, cited, p. 4; the figure for frozen salmon procured from *Pacific Fisherman*, 1938 Yearbook Number, p. 247.

NORTH PACIFIC FISHERIES

Canned.....	(48-lb. cases).....	1,508,577
Frozen.....	(1,000 lbs.).....	11,899
Mild-cured.....	(1,000 lbs.).....	2,629
Smoked.....	(1,000 lbs.).....	8
Salted and pickled.....	(1,000 lbs.).....	23
Dry-salted.....	(1,000 lbs.).....	10,898
Kippered.....	(1,000 lbs.).....	10

Comparing these Canadian figures with those in Table 1, and bearing in mind that the United States salmon catch was roughly 690 million pounds, it can be seen that a somewhat smaller proportion of the Canadian catch is canned than of the American. This disproportion is still greater in the case of smoking, kippering and pickling. On the other hand, the Canadians freeze a greater proportion of their catch and the amount of salmon which they put through the dry-salting process is very much greater both relatively and actually.

Plants engaged in the primary forms of salmon processing, canning, freezing or salting, whether in the remote regions of Alaska, in British Columbia, Puget Sound or the Columbia River area, are located at or near tidewater in places accessible to fresh water supplies and ocean transportation. A cannery consists of buildings for canning operations, housing for employees when these are nonresidents of the vicinity, and a heating and power plant. There is a wide variation in the size, equipment and hence the value of canneries. They may vary from single-line plants (a line is the unit of complementary equipment required for complete processing) to the 10-line plant. Some canners may own and operate fleets of ocean-going carriers, gill-net boats as in Bristol Bay, purse-seine boats, cannery tenders, scows, pile drivers, etc., and have numerous traps representing a considerable investment. Others have plants with only rented equipment and no fishing gear or floating equipment. The total capital invested in the fisheries industries of the north Pacific, including British Columbia (but excluding California), is estimated at \$160 millions. (See Chapter XI.) Salmon fishing and processing account for at least 80 per cent of this total, or \$130 millions.

As regards the number of persons to which the salmon industry gives employment, no precise figures are available. In 1937 the total estimated number of seasonal salmon workers (fishermen, transport workers and plant operatives) in all Pacific Northwest and Alaska districts was around 50,000, the vast majority

of whom were men. Those employed in Alaska alone numbered 27,399, of whom 10,048 were fishermen, 2,133 transport workers, and 15,218 workers in wholesaling and in processing plants.¹⁰ The number employed in British Columbia as fishermen and transport workers (all fisheries) was 11,184, and in fish canning and curing 5,574.¹¹ In Washington all divisions of the salmon industry, including fishermen, employed 4,750.¹² A somewhat greater number were employed in Oregon. This labor may be either directly hired by the salmon processing companies as in the case of shore personnel, transport workers and some of those employed in fishing, or they may be independent fishermen selling their catch to the processing plants or in the raw fish market.

The relative importance of gear operated by the entrepreneur fishermen and by the paid employees of companies owning the gear cannot be calculated, as statistics are lacking. Certain broad statements can nevertheless be made. Troll-caught fish are to be attributed entirely to independent fishermen both in Alaska and in the states. Purse seines in the states are also operated by independent fishermen, as are an indeterminate portion of the Alaska seines. On the other hand, the catch by traps is very largely the product of company-owned gear, although there are numerous cases of independent ownership. Likewise, in Bristol Bay (western Alaska) the gill netters use company gear; this is also true of the majority of those operating on the Columbia River. Putting together these known facts, it can be estimated that over half the American catch is accounted for by fishermen who are not independent entrepreneurs but are working for some company engaged in processing the raw product.

In 1937 the number of salmon canneries operating throughout the north Pacific area was 177.¹³ By territories they were as follows:

¹⁰ Ward T. Bower, *Alaska Fishery and Fur-Seal Industries* (annual), 1937, U. S. Dept. of Commerce, Bureau of Fisheries (Washington, 1938), pp. 107, 112, 113, 114.

¹¹ 15.

¹² Province of British Columbia, *Report of the Provincial Fisheries Department* (annual), 1937 (Victoria, B. C., 1938), p. 9.

¹³ Estimate of the Washington State Bureau of Fisheries.

¹⁴ Figures for Alaska from Bower, cited, 1937, p. 109. For the other regions information was obtained from *Pacific Fisherman*, 1938 Yearbook Number. Figures for Alaska canneries in *Pacific Fisherman* are slightly different from those of Bower, totaling 116. According to *Pacific Fisherman*, 1939 Yearbook, there were only 166 canneries operating in Alaska and the Northwest in 1938.

NORTH PACIFIC FISHERIES

Alaska.....	113
Western.....	23
Central.....	44
Southeastern.....	46
British Columbia.....	37
Puget Sound.....	13
Columbia River.....	11
Washington coast.....	2
Oregon coast.....	1
	—
	177

The number of companies operating these canneries was 111, many companies having several plants. Alaska, it will be observed, had well over half the total number of canneries and was the scene of operations by 75 companies.

Approximately 14 companies engaged in freezing salmon in Alaska in 1937, 13 on Puget Sound, 8 on the Columbia River and the Oregon coast, 8 in California and 9 in British Columbia.¹⁴ Several of these companies, however, were active in more than one district; accordingly, there is some duplication in the figures. In general they were all concerns which either were engaged in freezing other types of fish as well as salmon or were carrying on other forms of salmon processing. The same is true of the companies engaged in mild-curing salmon; in some cases a mild-cure plant is an adjunct to a cannery. The total number of concerns active in this operation on the Pacific coast in 1937 was 38, of which three operated both in Canada and in the United States. Here again there is a certain duplication of companies as some engage in mild-curing in more than one region. Eighteen operated in Alaska, 7 in British Columbia, 9 in Puget Sound, 6 on Columbia River and the Oregon coast and 7 in California.¹⁵

As can be seen, Alaska leads in the number of plants engaged in salmon processing, as is to be expected from its pre-eminence in the catch. However, as already stated, the management, purchasing and distributing center of the American industry is in the states. At the beginning of each season a large stream of men and supplies flows north, and later the finished products are shipped from Alaska to the primary salmon markets of Seattle, Bellingham and San Francisco.

¹⁴ *Pacific Fisherman*, 1938 Yearbook Number, p. 247.

¹⁵ *Ibid.*, p. 235.

FISHING AND PROCESSING TECHNIQUES

Within the framework of the salmon industry so far described there is a diversity of techniques representing different stages of technological advance. In the actual catching of the fish, for example, improving transportation facilities have served steadily to increase the range of fishing operations, even though in certain areas like Bristol Bay propulsion is still by means of sail. The mechanized production line of the canneries has reduced hand labor to a minimum; yet in the mild-cure concerns processing is still carried on by hand. Large refrigeration plants have grown up to store the frozen fish; but dry-salting, smoking and kippering are hand operations. However, while the pattern of industrial development is uneven, not only as regards different types of processing but also as among different areas, it may be said that the industry has become mechanized to a high degree.

Fishing Techniques

The fishing process itself employs methods for the most part as old as the industry. The main types of gear are gill nets, traps, beach and purse seines, fish wheels and troll lines. A knowledge of these gear and of the operations they entail is necessary for an understanding of the various phases of the industry. Conservation regulations, for example, are aimed primarily at control over the location, size and time of the various gear operations. Before proceeding to a detailed description, however, we may first note several characteristics of various salmon species and their life habits to which fishing techniques are adapted.

Kings and silvers are the only two species which can be regularly caught by hook and line, so that the catch from trolling is confined to these varieties. Trolling is therefore intimately linked with the fresh, frozen and cured fish trade. It is carried on mainly in outside waters, and, since it catches the fish when they are on the feeding grounds, it is not limited to the few months when the runs head toward the spawning streams.¹⁸

¹⁸ There is little definite knowledge as to where the salmon go after leaving the stream in which they are hatched. It is established that they must stay on the continental shelf as long as they need certain food to be found there. Whether or not they later pass off the shelf has not been determined.

The other forms of gear catch all species. Traps, reef nets and fish wheels are fixed gear set in localities near the shore where the runs of fish are known to pass as they head upstream. Gill nets are used in shallow water, where the fish are near the surface and gathered together in schools. Beach seines are also used where the water is shallow and the fish are running close to shore in their migration toward the spawning beds. More particularly, they are used in localities where there are sand bars or spits. The use of these four types of gear thus depends on the characteristic of the salmon which brings them each season in well-defined runs towards the home rivers. Purse seines, on the other hand, can operate wherever a school of the fish can be found. While they are effective close to shore they are also used in deeper water some distance from the mainland. Even here, however, they depend for their efficiency on the salmon being bunched together in the course of their migration.

The share of the Alaska salmon catch taken by the different types of gear is discussed more fully in Chapter V. Here it will suffice to say that in 1937 traps took 46.4 per cent of the catch, gill nets 24.3 per cent, purse and beach seines 27.7 per cent, hook and line or troll 1.4 per cent, and fish wheels 0.3 per cent.¹⁷ In the coastal states in 1934, the last year in which fixed gear was permitted by law in the state of Washington, and for succeeding years the percentages of the total catch taken by the various forms of gear were as follows:¹⁸

	1934	1935	1936	1937
Traps.....	23.5	0.8	1.9	1.5
Gill nets.....	25.0	28.4	44.2	32.7
Seines.....	34.2	47.0	18.2	43.8
Troll.....	16.4	21.8	27.4	18.6
Fish wheels.....	0.3	—	—	—
Dip and reef nets.....	0.5	1.5	3.7	3.3

In British Columbia purse seines and gill nets are the predominant gear, taking 49.0 and 42.2 per cent respectively of the 1937 catch.¹⁹

¹⁷ Compiled from Bower, cited, 1937, p. 100.

¹⁸ Figures for 1934-36 compiled from Fiedler, cited, 1935-37; 1937 figures compiled from information obtained from the U. S. Dept. of Commerce.

¹⁹ Canada, *Eighth Annual Report of the Department of Fisheries for the Year 1937-38* (Ottawa, 1938), p. 29.

The *gill net* is the oldest form of gear used in the commercial fisheries of the Pacific coast. As its name implies, it catches fish by entangling their gill covers in the mesh. The gill net varies in length and depth, depending on the district in which it is used. It is suspended downward from a rope with cork floats, and sinkers are attached to the bottom of the net so that it stands erect in the water. The dimension of the mesh used depends on the size of the fish which is to be caught. The net is payed out from a small boat across the path of the fish run, the free end usually being attached to a buoy or stake, and is pulled in after the fish become enmeshed. The drift gill net is ordinarily used just outside the mouths of the rivers.²⁰ Fishing is done at night if the water is clear, as the fish are able normally to see the net in daylight. If the water is muddy, however, fishing can be done by day. The set gill net, a similar but generally smaller variety of net, is either staked or anchored, usually across the stream.

Gill nets are the only form of gear allowed by regulation in Bristol Bay, Alaska, the western area where red salmon predominate. They are also used in various other areas of Alaska, and in the Columbia River area, British Columbia, California, Oregon and Washington. As a general rule gill-net boats are operated by two men, although there are a number of one-man boats. The boats in Bristol Bay and one or two other districts of Alaska have no motive power except sail, but in the other regions engines are used. Restriction of fishing operations in Bristol Bay to this one form of gear, limited moreover in its mobility, has been a government measure designed to limit the take of the valuable red salmon. But little change has taken place in gill-net effectiveness from their earliest introduction. They are of limited length and size of mesh in various areas largely because of official regulations rather than because the prevailing type represents maximum efficiency.

The introduction of *fish traps* in Alaska and the state of Washington in the 1890's and 1900's furnished the first important impetus to the growth of the salmon canning industry. For many

²⁰ In the case of Bristol Bay, where the waters are extremely shallow, the gill-net boats operate chiefly outside the three-mile limit. In Columbia River fishing, on the other hand, the boats operate in the river itself.

years the investment of capital paralleled the rate of trap installations. Salmon traps have constituted a strategic factor in enlarging and stabilizing supply, although their efficiency has necessitated regulation in the interest of conservation. Being expensive as well as efficient, they have fostered a concentration of control over fish supplies. To a lesser extent they have also furnished a storage facility.

The trap, sometimes designated as the pound net, is a form of fixed gear that is used extensively in Alaska, except in Bristol Bay and certain smaller districts, and in restricted areas in British Columbia and Oregon. It may be either the pile-driven or floating type. In the former, piles are driven into the bottom and secured by wood stringers. In the floating trap, logs are fastened together to form a framework of the same shape as that of the driven trap. The lead which guides the fish to the enclosures is a wall of webbing attached to piles or stakes or to a cable supported by floats in the case of floating traps, usually placed at right angles to the shore. Back of the lead comes the "heart" which is shaped like a V with the wings extending on either side of the lead. The outer heart leads into the inner one and the inner one into the pot, a small rectangular enclosure. The fish pass from the pot by means of a small tunnel into the spiller and are thence brailed out into a scow which is brought alongside. Traps are usually removed each fall and reconstructed at the opening of the new season. Depending on their location, their output varies from a few fish to hundreds of thousands.

The pile-driven trap underwent only slight change in most districts after its introduction. In the Puget Sound area and in Alaska the early pile-driven trap was improved in minor ways but no advance was made in general principle or method. An important change in trap fishing came with the invention of the "floater." The pile-driven traps were fixtures and did not always reach the runs; they were often difficult to build and maintain. The floating trap, built in the same formation as the pile trap, has gained wide recognition as an efficient fishing device when properly located, because it can be built in protected waters and floated to points where the fixed trap could not be constructed. In 1937 there were 283 floating traps in Alaska as compared with 170 driven.²¹

²¹ Bower, cited, 1937, p. 99.

The relatively high cost of both types tends to keep them in the hands of the larger fishing concerns. Indeed, traps were abolished by initiative in Washington in 1934, partly on the grounds of their too great efficiency as fishing devices but also in response to charges of monopoly control of fish supplies. In British Columbia they have never been used to any great extent. Although they were introduced in the 1880's, it was not until the 1900's that they were generally permitted, and they were reduced in number in the period following the World War as a means of spreading work among the fishermen. One result was some dispersion of fishing and also of the canning industry. The concentration of fishing which prevailed with the use of the traps gave way to a slightly broader distribution of fishing among the craftsmen.²²

In all districts where they have been used, traps have been regulated in order to restrict their productivity. They are considered by some authorities to be supereffective in shutting off runs, hence restrictions have dealt with the creation of open areas, free space between the traps, and closed seasons to allow for required escapement. The relative efficiency of traps varies but little from year to year, save as their yield is affected by variations in runs.²³

While the *purse seine* had a low productivity in early years, a revolution came over this division of the fishing industry through the introduction of the internal combustion engine and later the Diesel engine in the 1920's. The unit output of this gear has varied almost directly with the mobility of purse-seine boats. The new purse seiners soon rivaled the fish traps in vol-

²² It is claimed by many operators that the reduction of the traps in British Columbia has resulted in a higher cost of canning in that district. The mobile gear units are unable to store any considerable quantity of freshly caught fish. The coming of the runs in very short periods of time compels the construction of larger plants than would otherwise be needed to accommodate the peak requirements, it is said. The investment is thus greater per unit of output than would be the case if storage furnished by traps were available. Most of the traps have extra "spillers" devised for the purpose of holding large runs, in fresh form, until the canneries can finish the mobile gear catch and use the extra supply from the traps. See *Fish Traps in Alaskan Waters, Hearings before the Committee on Merchant Marine and Fisheries on H.R. 4254 and H.R. 8213, 74th Cong., 2nd sess.* (Washington, 1936), pp. 181-84.

²³ For further discussion of various aspects of salmon traps, see pp. 51-53, 63-64, 83, 87-88, 99, 107, 116-17, 123.

ume of catch and consequently also became the object of regulatory control.

The purse seine is a net composed of webbing of several different sizes of mesh. The top of the net is attached to corks, while the bottom, through which a draw rope is run, is heavily leaded. When a school of fish is sighted the net is payed out around the school. The draw string is then drawn, closing the bottom of the net in the form of an old-fashioned purse. Rounsefell and Kelez say of this gear, "although the purse seine is inseparably associated at the present time with the highly specialized vessel from which it is fished, the seine itself has undergone but little change, except in size."²⁴

The early efficiency of the purse seine was slight, due to the necessity of using man power to tow the gear on scows to the fishing grounds.²⁵ Slow transportation, with only the oar and the sail as motive devices, naturally restricted general mobility in fishing operations. The transition to motor transport, when it took place, was rapid and pervasive. First came the change from the old rowboats and sailing vessels to gasoline seine boats.²⁶ The fishing scow became outmoded. Seaworthiness and fishing versatility improved with changes in construction. Larger and more powerful vessels permitted the carrying of bigger nets, augmented the crews, and extended the voyages to better fishing grounds. This was true not only of salmon but of tuna and other fisheries as well. Larger catches were brought to the canneries in fresher condition. Much of the old manual work could now be done by mechanical power supplied by engines, which made for greater production and less arduous labor on the part of crews.

Today purse seiners are power boats universally; in the Seattle fleet at least 50 per cent have Diesel engines. This form of gear is used extensively for salmon both in Puget Sound and in south-

²⁴ George A. Rounsefell and George B. Kelez, *Salmon and Salmon Fisheries of Swiftsure Bank, Puget Sound, and the Fraser River*, U. S. Dept. of Commerce, Bureau of Fisheries, Bulletin no. 27 (Washington, 1938), p. 726.

²⁵ Cobb, cited, p. 481.

²⁶ One of the "modern" purse seiners of 1910, the "North Star," was 40 feet in length, 10.6 feet in beam and powered with a 15 horse-power gas engine. Many new first-class steel ships of 2,100 tons and over were used by the packers. *Pacific Fisherman*, Annual Number, 1910, pp. 48-49. For more complete discussion of these developments, see the files of this journal for 1906 and the following years.

eastern Alaska, and to a small degree off the Alaska Peninsula and in the Prince William Sound and Kodiak districts. In the states the vessels average eight men to a crew. In Alaska, however, where the boat is restricted to a 50-foot keel-length maximum in the interest of limiting efficiency and hence fishing intensity, the average crew is somewhat smaller.

An interesting correlation exists between the size of purse-seine boats and fishing efficiency. This relationship has been carefully studied by Rounsefell and Kelez, whose data are reproduced in Table 2. These figures are based upon the records of the Puget Sound purse-seine fleet during the period 1909-34, and give the percentage of the average catch per vessel taken by vessels in each size class, calculated as a ratio to the percentage taken by vessels in the 10-14 ton class.

For pinks, cohos and chums the relative-efficiency ratio of purse-seine vessels increases consistently with their size up to the largest class, 40 tons and over. The only exception is in the sockeye catch, where special factors cause dense schooling for brief periods in certain localities and where as a result "disproportional catches" may be made by fishing vessels. Rounsefell and Kelez also demonstrate that the average vessel efficiency of the Puget Sound fleet virtually doubled from 1909 to 1934 (p. 739).

Table 2. *Relative Efficiency of Puget Sound Purse-Scine Vessels*¹

Species	Vessel size in five-ton classes ²							
	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 and larger
Sockeye ³	0.66	1.00	0.99	1.46	1.56	1.43	1.55	1.59
Pink ⁴	0.92	1.00	1.27	1.64	1.85	2.02	2.33	2.25
Coho.....	0.83	1.00	1.15	1.69	2.19	2.27	2.37	2.12
Chum.....	0.79	1.00	1.21	1.43	1.70	1.78	1.91	1.98
All species.....	0.80	1.00	1.16	1.56	1.82	1.88	2.08	1.99

¹ The average delivery of each species in each size class was determined as a proportion of the average delivery in all classes, and then calculated as a ratio on the basis of the 10-14 ton class as unity. Averages are based on the catches of 1916-19, 1922-25, and 1928-34.

² Size in net tons, official register.

³ For even years only.

⁴ For odd years only.

Source: George A. Rounsefell and George B. Kelez, *The Salmon and Salmon Fisheries of Swiftnose Bank, Puget Sound, and the Fraser River*, U. S. Dept. of Commerce, Bureau of Fisheries, Bulletin no. 27 (Washington, 1938), p. 738.

Beach seines are used where there are beaches, sand bars or gravel spits. They require a large and a small boat. The latter sets out with one end of the net for the bar, while the larger

boat heads offshore against the current, paying out the net in a semicircle. The line attached to the outer end of the net is then brought to the bar and horses or steam winches are used to pull it in. There is a bag or bunt in the center of the net. This gear is used chiefly on the Columbia River and at Kodiak Island in Alaska.

Fish wheels have been used extensively on the Columbia River since 1879, and have shown very little improvement as a fishing device since their first introduction. They have been an important factor in catching salmon on the large rivers when permitted by regulation. At the present time they are little used. They are not commercially operated in Alaska, although the Indians use them on the Yukon, Kuskokwim and Copper Rivers. In Washington the wheel was outlawed by "Initiative 77" in 1934, which forbade traps, wheels or any "fixed gear" for salmon fishing, nor is the wheel now used in Oregon.

Wheels may be stationary or attached to scows so that they may be moved from place to place. The gear comprises a framework to which a wheel is attached. The latter consists of two or three dip nets made of wire netting attached to an axis, these nets acting as the buckets of the wheel. The pressure of the current causes the wheel to revolve, and as it does so the buckets scoop up the salmon. Wheels, like traps, must be located at places where the salmon are known to run.

Trolling is one type of commercial salmon fishing which utilizes the hook and line, and as already indicated is limited in its use to two species of the fish—the king salmon and the silver. Salmon trolling is carried on from California north to southeastern Alaska, generally in "outside" waters. The number of lines to a boat vary from one in a hand-operated rowboat troller, such as may be found in Alaska, to six lines for the largest boats. The lines are attached to poles fastened to the sides, bow and stern of the boat. The line is weighted with lead, and leaders are attached at regular intervals to the main line. The hooks with the bait or spoon are attached to the leader. As in other forms of fishing, the trend is toward the use of Diesel-powered boats; it is estimated that about one third of the trolling fleet are now so equipped. If the boat is not making daily deliveries of its fish, ice is used to preserve the salmon.

Very little change in the gear used by trollers has taken place from early times. Productivity has been greatly increased, however, through the use of larger power boats. Diesel engines increase the size, the cruising range and the maneuverability of trolling boats. Greater speed brings the catches from more distant grounds in better condition to curing plants, fresh fish markets and occasionally to canneries. Some of the newer boats have three- and four-man crews, though the general rule is two- and one-man boats.

There are one or two other forms of net gear, but they are hardly of sufficient importance to warrant description. Taking salmon gear as a whole, it can be seen that the main technological advances have been the introduction of the trap and, more important, the development of power transportation. These advances have been considerable; indeed, in the interest of conservation increased efficiency of fishing has had to be countered by more stringent regulations of the gear types and of the places and periods in which they may be operated.

Salmon Cannery Methods

The first cannery methods were slow and clumsy, using hand labor entirely and often turning out unsatisfactory products.²⁷ They stand in marked contrast to the modern process for transforming fish into a canned product. Mechanization has reduced the necessary labor by about three fourths (see p. 112). Today there is a straight-line continuous processing from the delivery of the fish in scows and tenders to the storage of the final canned product.

The fish are hoisted to the cannery floor by means of conveyors. Here they are mechanically headed, split and cleaned, by what is known as the "Iron Chink."²⁸ They then are passed to the cleaning tables where they are thoroughly washed. Later they go to the cutting machines, and thence to the fillers, where cans are filled with fish and the requisite amount of salt. The cans

²⁷ For a description of the early process the reader is referred to R. D. Hume, "The First Salmon Cannery," *Pacific Fisherman*, Jan. 1904, pp. 19-21; quoted in Cobb, cited, pp. 516-17.

²⁸ The "Iron Chink" is a machine first used in 1903 which beheads, splits and cleans the fish, and is adjustable to the various species with the exception of kings. Its name derives from the fact that the labor it replaced was Chinese.

then proceed over a weighing machine to the patching tables where any weight discrepancies are rectified by hand. The lids are lightly clinched by machine and finally sealed in a vacuum. The cans later pass through a washing machine at some stage following the filling, although the position of the washer in the line varies.

The canned product is now ready for cooking in a retort. The length of time, the pressure and the temperature at which the fish are cooked vary with the species of fish and the size of can. For a pound can the cooking time is never less than 90 minutes at a temperature of 240° F. The cans are washed with lye and water, then cooled. After this they are labelled (when this is done at the plant), packed into containers and stored. A standard case contains four dozen pound cans. Actually most half-pound cans are shipped 48 to the case while quarter-pound cans go 96 to the case; but for statistical purposes the standard case is 48 pounds of fish.

Cans to contain the finished product are of course a prime requisite in cannery operations. In the states, where transportation is not an important factor, the cans are bought ready-made from the can companies. This procedure is impractical for the Alaska plants; on the other hand, only one large company follows the practice of making its own cans. Other concerns import semifinished cans which merely need to be "blown-up" or re-formed and the bottoms seamed. The can-forming line is synchronized with the canning line so that cans are made up as needed.

Much of the machinery composing a canning line is not owned by the operator but is rented from the can company from which can supplies are bought. Minor items, however, such as the coolers, trays on which the cans are stacked, retorts, retort cars, patching tables, lye washing equipment and "Iron Chinks" are owned by the cannery operator. Generally one "Iron Chink" serves two lines of canning machinery.

In the early years of the industry, as noted elsewhere, the cannery labor²⁹ was largely Chinese, but owing to the Chinese exclusion act the available supply was seriously diminished and is

²⁹ For a more extended discussion of the labor factor in the salmon fishing and processing industries, the reader is referred to Chapter XII.

now very small. At present the principal type imported into Alaska is Filipino. In Washington and Oregon as a general rule the cannery work is done by white workers, many of whom are women. Inside mechanical labor is performed largely by white men. Local residents of Alaska, it is said, are now generally given preference in the canneries over nonresident workers, but their number is limited owing to the scarcity of population. It is largest in the southeastern region of the Territory, but decreases in the central section and still more in the western.

Labor Output in Alaska Salmon Canneries

In view of advances in canning technique—that is, the introduction and perfecting of mechanical processes—the moderate increase in output per capita during the last 30 years in the Alaska salmon canneries is noteworthy. Fig. 2 shows the trend of output per worker in the three Alaska regions. (Shore workers only are considered, as distinct from fishermen and transport workers.) In considering this chart, it must be remembered that no attempt has been here made to discount variable factors such as changes in the length of the working day, the shortening of the fishing season by government regulation, or changes in the size of the runs.³⁰ Unfortunately information is not available to estimate changes in production per man-hour over this period of years. Such a calculation would show more clearly than one of seasonal output per worker the effect of the general introduction of the "Iron Chink" on a large scale in 1911-13 and again the introduction of high-speed cannery lines in the 1920's. Nevertheless, these influences are observable here.

As the figure stands, however, it also brings out clearly the effects of the variations in the supply of raw material. Years of markedly low runs, such as 1919, 1925 and 1930 in western Alaska or 1927 in the southeastern region, are those of low per capita output, whereas years of good runs bring a rise in the curves. The inability of packers in many cases to forecast the size of runs, the isolated location of many canneries, and the necessity for a certain minimum number of workers irrespective of the size of the pack result in a labor force which often does not vary closely in proportion to variations in runs. It is noticeable, how-

³⁰ See Chapter III for discussion of trends in production.

NORTH PACIFIC FISHERIES

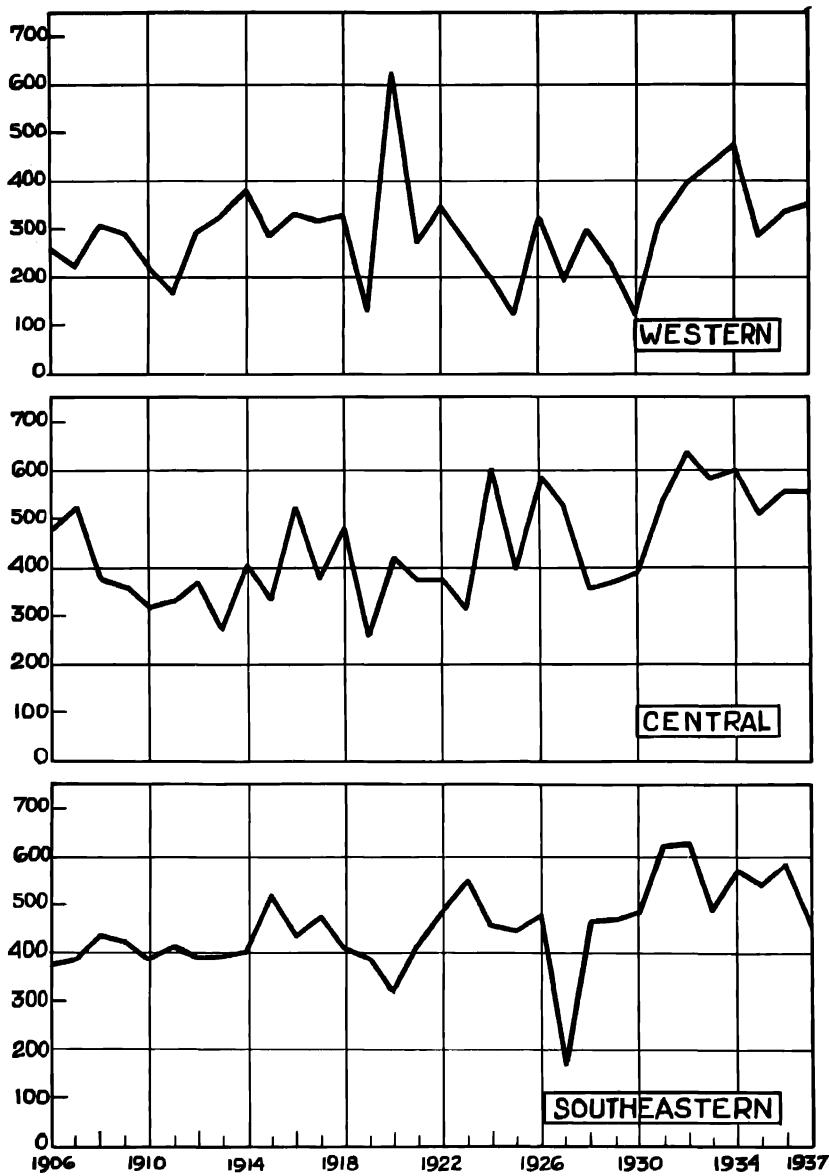


Fig. 2. Cases Packed per Worker in Alaska, 1906-37.

Source: Ward T. Bower, *Alaska Fishery and Fur- Seal Industries* (annual), 1906-37, U. S. Dept. of Commerce, Bureau of Fisheries (Washington).

ever, that the years of record labor output are not those of the peak packs, and tend to be associated with reduction in canneries and personnel. (See Figs. 5 and 6 for Alaska pack and canneries.) Yet, viewing the period as a whole, the effects of mechanization in raising seasonal per capita output seem to have been largely offset by counterinfluences tending to hold per capita production near the level of pre-war years.

Transportation of Operating Supplies

The major portion of the supplies essential to cannery operations in Alaska must be transported from the states. This seasonal movement of equipment as well as of labor is a striking feature of the industry. In certain regions the materials necessary for building traps are available locally, as is also a certain amount of Alaska coal used in processing. Before the season starts, however, the companies must bring up millions of dollars' worth of machinery, cans, provisions, material for cases, hardware and necessary fishing equipment where this is owned by the cannery. In southeastern Alaska it is possible to supplement initial supplies with further shipments from the states delivered during the season. In the case of the Bristol Bay area, however, such procedure is not feasible because of the time element and the limited ocean transportation serving that region. All supplies usually must be brought in before the opening of the season.

When operations are concluded, the crew and the pack must likewise be transported back to the states, again either on company boats or on the regular transportation lines. The size of this transportation item in the cost of putting up the pack (see pp. 195-96) varies considerably with the location of the plant, the amount of help imported, and the amount and nature of the supplies taken in. Those canneries located in southeastern Alaska that employ local Alaska labor chiefly and obtain their supply of raw fish from independent fishermen naturally have a much smaller transportation item in their budget than canneries located to the west.

Cannery Operating Risks

At this point it may be well to note the numerous risks characterizing cannery operations. Some of them, notably the variability

of prices and demand from one season to another, are not peculiar to the salmon industry, though they are present in marked degree. Others are of a somewhat special character. Most of them will be elaborated later, but they may be outlined here as they are a dominant characteristic of the industry.

One of the uninsurable hazards to which salmon canneries are subject is variations in fish runs. The canner is basically dependent on fish supplies over which he has no control. Moreover, though a high proportion of his expenses are direct he must characteristically make heavy outlays at the beginning of the season. Even labor costs, for example, are really part of the fixed overhead advanced against the season's operations in large degree, for many of the workers are brought from the states with guarantees of minimum earnings. Yet it is difficult to forecast the runs in a prescribed district and therefore to correlate the season's outlay with the actual amount of fish available. Another risk in the supply of raw material is the variability of government regulations, which may close areas to fishing or to types of gear. These may cause considerable dislocation even when announced before plans for the season are under way, as for example when the number of trap sites is reduced. Changes in the regulations after the season's plans are made, though infrequent, increase the hazards still more. Finally, the inability to secure operating supplies from local houses, especially in western and central Alaska, complicates the problem of transportation. It places a high premium on the planning and correlation of plant activities, and introduces an added risk factor for the cannery remote from sources of supplies and labor.

A compensating factor is found in the relative mobility of the cannery and floating equipment. The moving of the rented machinery is the problem of the can supply company, while the balance of the equipment can be moved to another plant by the operator without great cost. The necessity of abandoning a location is therefore not as serious as, for example, the shutting down of a steel plant. The labor supply, moreover, is essentially mobile. The removal of a plant makes little difference to non-resident workers, coming seasonally to Alaska as they do. And in the case of the resident labor, it is not unknown for Alaska fishermen and workers to journey many miles to the cannery.

The salmon canner is likewise open to labor hazards common to virtually all industries. Operations may be handicapped or suspended by labor tie-ups. For him, however, the situation is rendered peculiarly acute by the high seasonality of operations, the perishability of the raw product and dependence upon the limited type of ocean transportation.

Certain risks of a purely physical character are also inherent in the industry. The isolated location of many of the plants, the inadequacy of fire-fighting equipment, the cheap plant structures and fuel stores, all make for a high degree of risk and high insurance rates. Destruction and loss of boats and gear due to marine accidents are something which has likewise to be discounted in any salmon company's financial planning. All these hazards bear with especial weight on the small concerns whose more restricted operations make it difficult to hedge against unforeseen occurrences in a particular locality and whose limited financial resources make it difficult to cover even those risks which are commercially insurable.

Floating Canneries

In addition to shore canneries there are a few floating canneries operating in Alaska each season. This method of operation has not spread extensively since its early introduction in 1911. In 1936 there were three floaters with a total pack of slightly under 164,000 cases, as compared with a total Alaska pack of nearly 8,455,000 cases. In 1937 there were seven, but they were still a negligible factor in the industry.

Mobility is said to be the great asset of the floating cannery. Yet the truth is that there is a limit to which this apparent advantage may be utilized by the floater. The shortness of the season during which profitable operations may be conducted naturally makes many shifts of location impracticable. The floater is obliged to have its supply of raw fish provided by independent fishermen or by its own or chartered boats and gear. The variable regulations of the different localities would necessitate a large supply of differing sizes of nets if the floater shifted its base of operations very often. And if traps are used the floater is thereby restricted to a certain radius of action.

Another apparent advantage lies in the fact that the floating

cannery can serve as its own means of transporting men, provisions and pack. However, operators of floaters assert that this saving is offset by the greater labor bill. As a result of the restricted space more labor is required to put up a pack on a floater than on shore. In a shore plant, the storing of the pack can wait until there is a slack period in the canning process. On a floater, the pack must be stored as soon as cool so that men must be available to attend to this storing while others are engaged in the packing process.

To compare costs is almost impossible, so much do they vary according to locality, size of plant and size of pack. Large companies which have tried floating canneries have discarded them, and much of the prevailing opinion does not credit them with any superiority from a technical or cost standpoint. When shore operations are impossible, however, as would be true of Japanese fishing along the American coast, the floaters present obvious advantages. The floating cannery developed by the Japanese is strikingly different from the American. The former is much larger and is capable of operating on the high seas. It utilizes the mother-ship principle with a fleet of small fishing boats using it as a base. (See Chapter XVI.) It also operates in outside waters and employs gear not permitted by United States regulations.

Other Forms of Processing Salmon

Although canning dominates the salmon industry, the other forms of processing may be mentioned briefly in order to complete the picture.

The process of freezing is usually supplementary to other methods of handling fish. The surplus catch at any one time is preserved in this way and held for better prices. Freezing of salmon began in the late 'eighties in California and on the Columbia River and spread to Alaska in 1902. The output of frozen salmon considerably expanded in 1913. Freezing is essentially a simple process but its use has depended upon the development of refrigeration. The fish are frozen as soon as possible after they are caught in order to retain as perfectly as possible the natural flavor. After freezing the fish is glazed with ice, then kept at a temperature of about 15° F., and thawed out slowly before cooking or further processing.

All species except the red salmon are used in the freezing process, with cohos and chums ranking as the choicest. The steel-head trout is also much esteemed. The total amount of salmon frozen on the Pacific coast in 1938 was 29,019,550 pounds, not including steelhead, which totaled 794,183 pounds. Distribution of this poundage among the various areas concerned was as follows:³¹

	Salmon	Steelhead
Alaska.....	7,918,897	4,274
British Columbia.....	12,662,933	324,000
Puget Sound.....	7,790,087	—
Columbia River and Oregon coast.....	207,478	465,909
California.....	434,155	—

Mild-curing of salmon has been carried on since 1894. In the early years the salteries were operated in conjunction with canning operations, but in recent years mild-curing has become an independent industry. The process requires no elaborate or expensive equipment, but cold storage is necessary to keep the product. Barrels, salt and knives are the necessary implements. The species of salmon generally used in this process is the king, supplemented in some degree by the silver.

The fish is cleaned, split, slightly salted and then packed with salt in alternating layers in a barrel or tierce.³² Brine is poured in and the tierce allowed to stand for a certain period in a cold storage room. Later the fish are taken out, washed, graded and repacked, and the tierces again filled with brine. Kept in cold storage, the tierce well filled with brine, mild-cured salmon will stay preserved for months. The 1938 production for each of the Pacific areas was as follows:³³

Alaska.....	7,786	tierces
British Columbia.....	3,128	"
Puget Sound.....	3,657	"
Columbia River and Oregon coast.....	1,679	"
California.....	1,572	"

Other salting methods are pickling and dry-salting, both of which are of considerably less importance than mild-curing. Pickling, although the earliest method by which salmon was pre-

³¹ *Pacific Fisherman*, 1939 Yearbook, p. 275.

³² A tierce contains about 825 pounds net.

³³ *Pacific Fisherman*, 1939 Yearbook, p. 267.

served on the West Coast, is now almost entirely concentrated in Alaska. The process consists of placing the split cleaned fish in a butt with a large amount of salt. When the cask is full weighted boards are placed upon the fish to keep them covered by the liquid which forms. After about a week the fish are removed, scrubbed and repacked with salt. Dry-salting involves packing the dressed fish with salt in boxes.

Secondary processes utilizing fish which have already passed through one form of preservation are smoking and kippering. Smoked fish have already been either mild-cured or pickled. The fish are soaked to remove as much salt as possible and then hung in a smokehouse for a certain number of hours. The fire is made of nonresinous wood, the object being to smoke the fish without cooking. Smoked fish may be kept for some time if stored in a cold storage room. If frozen it will keep indefinitely but the quality deteriorates as it becomes dried out.

Kippered fish is even more perishable. This product is prepared from frozen salmon, white kings usually being used. It is thawed, soaked for some time in a brine in which there is vegetable dye to give it the desired color, and then subjected to heat and smoke, becoming slightly cooked in the process. It too can be kept longer if frozen, but the process is detrimental to the product. The difficulties of preserving smoked and kippered salmon center their production near the localities where they are to be consumed and also prevent its being undertaken on a large scale.

As can be seen by the preceding description, the secondary methods of processing the salmon catch are not such as require a large investment. The amount of labor involved is also small as compared with the canning process. In 1937 only 2,534 out of the total 27,399 individuals engaged in the whole Alaska salmon industry, or less than 10 per cent, were employed in processes other than canning. Salmon canning dominates the utilization of this important fish catch and attention will be concentrated thereon throughout this study.

III

SALMON CONSERVATION ON THE PACIFIC COAST

THE PROBLEM

THE PREVIOUS chapter has given a brief review of the natural characteristics of the Pacific salmon and of the varied industrial processes based thereon. Before proceeding to further analysis of the industry, it is important to consider the basic foundation of the fisheries—the supply of fish, as affected by the growth of commercial fishing and by government regulation in the interests of conservation. Past experience has demonstrated the vital nature of this conservation, constituting as it does a restraint on exploitation of the natural resource in order that a future supply may be assured. Such restraint, it is now generally felt, works to the interest of the fishermen, the industry as a whole and the entire country. The salmon reserve represents a segment of national wealth, which if wisely used can be passed down from generation to generation for enjoyment and profit.

Conservation of natural resources is coming to be accepted as a necessity if such resources are not to vanish from the earth. It is a recent development, however, and one which has been necessitated by the increased efficiency of man's exploitation since the coming of the machine. A competitive industrial system, moreover, has made it virtually impossible for a brake to be applied on exploitation except by government control. Since the early days of the salmon industry the danger of unregulated exploitation has been apparent; yet any concern acting singlehandedly to protect the salmon would merely have sacrificed its own interests.

It is the function of conservation to offset the dangers to supply inherent in technological advance. The individual fisherman equipped with spear or hand net, with a range of operations limited to that afforded by a canoe or sailboat, intent on supplying at most his immediate community with food, was a force of destruction whose ravages nature could repair. If, however, the

full impact of modern technology in fishing, preserving and transporting were allowed to spend itself against the fishery supplies without restraint, the reserves would disappear in a very short period of time. Aquatic nature has not adjusted itself to exploitation by means of modern mass production. This is now generally recognized by fishery authorities and by the responsible portion of the industry. Social control of fish resources is now an accepted philosophy; it is within the province of the government to protect and supervise yields and it is its duty to do so.

Coincidental with the struggle for acceptance of this principle has been the effort to evolve satisfactory conservation techniques. The maintenance of the salmon reserves of the north Pacific at a reasonably constant level has been a problem to which the fisheries departments and bureaus of the Pacific states, of the United States Federal government and of the Dominion of Canada have devoted considerable attention. They have sought to establish a balance between the size of the catch and the escape-ment of salmon up to the fresh-water spawning grounds so that the runs shall recur not for a few decades but in perpetuity. Hatcheries for salmon propagation and the distribution of the young fish have also been employed to counteract diminution of supply. Nor has intensified exploitation by competing commercial interests constituted the only hazard to the runs. It has also been necessary to combat the inroads on the salmon made by modern civilization. It is not only a too thickly massed array of fishing appliances which destroy the runs. Pollution of streams, the building of dams and obstructions, irrigation ditches, all combine to change the natural conditions of the rivers and to limit the chances of survival for the salmon.

Years of research, study and experiment have now gone into the working out of methods of effective conservation. Scientific knowledge of the habits and nature of the salmon has been an obvious necessity for adequate control measures. A large body of information has been amassed and more is still being added.

Salmon conservation has not been confined, of course, to the United States and Canadian fisheries. On the other side of the Pacific the Soviet Union regulates the time, areas and gear types for fishing and also carries on fish-culture work. In Japan considerable emphasis is laid on propagation of salmon in hatcheries

and the distribution of the young fish. In Europe, where 13 countries engage in fishing the Atlantic variety of salmon, varied systems of law and regulation seek to conserve the fish by keeping the streams free of obstruction or pollution, limiting gear and fishing seasons, etc.¹

On the northwest coast of the American continent conservation, difficult in itself, is further complicated by questions of national and state jurisdiction. It is impossible adequately to protect some salmon runs without cooperation between at least two administrative entities. The salmon fisheries of Alaska are controlled by United States Federal legislation, which, after following a course of inadequate measures and imperfect enforcement, was effectively stabilized in 1924. Certain provisions applicable to the whole territory are embodied in the laws, while detailed regulations suited to the shifting needs and conditions of each district are left to the discretion and responsibility of the Secretary of Commerce, and under him the Bureau of Fisheries. The states of Washington, Oregon and California have individual laws and regulations administered by their own fisheries departments. The two former have concurrent jurisdiction over the Columbia River where it forms their joint boundaries.

Judging by the record to be presented later, it would seem that state conservation has not been as efficient as that of the Federal government. Particular difficulties hamper conservation in the states. Chief of these have been jurisdictional jealousies with special reference to Federal action, and the greater vulnerability of the state conservation policies to pressure from groups whose interests may be injured by regulatory action and whose influence counts more in state capitals than it does in the larger arena of national politics. Another factor which sometimes complicates the conservation issue is the natural desire for tax revenue and hence the encouragement or toleration of gear and practices which can stand a high levy. Note must also be made of the greater hazards to the fish accompanying the industrial settlement of the states as compared with Alaska.

Canadian salmon fishing is directly regulated by the Dominion

¹ Cf. "Laws and Regulations in Summary Concerning Salmon and Trout Fisheries," compiled by T. E. Pryce-Tannatt, *Conseil Permanent International pour L'Exploration de la Mer, Rapports et Procès-Verbaux des Réunions*, vol. 96 (Feb. 1936).

government rather than by the Province of British Columbia. The latter, however, exercises indirect control, as it has authority over fish canning and cannery operations. One of the most crucial questions in the conservation of British Columbia salmon has concerned the Fraser River runs. Since the salmon on their way to the waters of the Fraser River system pass through Puget Sound where they are fished by Americans, effective conservation has necessitated measures of joint control. Attempts to establish international regulation were unsuccessful for more than 30 years, and it was only in 1937 that a treaty for this purpose finally went into effect, 13 years after the precedent-making treaty for United States-Canadian regulation of halibut in the Northwest had been agreed upon.

Thus we see conservation as a variegated pattern of types of control and jurisdiction. With the expansion of fishing activities the growing urgency of the conservation issue is forcing settlement of conflicting jurisdictions in such a way as will adequately protect the fish supply. The conflict has now been projected on a larger scale, however, by the recent experimental efforts of Japanese fishermen to tap the salmon supply of Bristol Bay off the shore of western Alaska. Here, as elsewhere, the development of floating cannery technique has enlarged the radius of activity on the part of maritime fishing fleets and has accordingly presented new problems of effective conservation control. The exploitation of salmon runs along the shores of this continent by nationals of countries thousands of miles away has come within the bounds of possibility. As a result alarm has been created not only that the undisputed control of Alaska salmon by American nationals might be interfered with but also that the whole program of conservation might be undermined by foreign fishing beyond the reach of United States fishery authorities. This matter will be discussed at length in Chapter XVI.

CONSERVATION IN THE NORTH PACIFIC

Conservation of the salmon reserves in the Pacific Northwest and Alaska is of an importance which transcends the bounds of national interest. These are the great salmon reserves of the world. Fig. 1 shows the comparative importance of the United States and Alaska, British Columbia, Siberia and Japan as sources of canned

salmon. This is the main form in which the Pacific salmon reaches the ultimate consumer.² It is apparent that the United States and Alaska contribute more of this food product than the other three regions combined. Add the output from British Columbia and it is clear that it is to the east side of the Pacific that the world looks for the bulk of its salmon supply. Of the total catch of the north Pacific (on either shore) it has been estimated that about 57 per cent is landed in the United States and 14 per cent in Canada.³

The first salmon cannery on the Pacific was built on the Sacramento River in California in 1864.⁴ Prior to the development of the canning technique salting had been the principal manner by which salmon were preserved. Now came a new method, clumsy at first but later to be improved, by which huge quantities of fish could be made available cheaply for consumption months later at a distance of thousands of miles and in a form which required no secondary process to make it palatable as was the case with the salted salmon. The first pack amounted to 2,000 cases of king salmon. The expansion which followed was rapid; more and more canneries were built, new areas were exploited and new species of salmon were put up in cans. The salmon pack on the Pacific coast, including Alaska, passed the million case mark in 1882, and by the end of the century more than three million cases were packed each year.

Salmon cannery jumped to the Columbia River in 1866 and 10 years later 17 canneries were operating there with a pack of 450,000 cases—still all of king salmon. In 1870 the first salmon was canned in British Columbia on the Fraser River, and by 1900 69 canneries were operating. In 1877 both Puget Sound and the Oregon coast came into the canning field, and in 1878 the first cannery was built in Alaska. The northward migration of the industry was rapid.

As regards the grade of salmon packed, information is not available for Alaska before 1896. At this date the five main species

² Of the total north Pacific supply, about 86 per cent is canned. U. S. Tariff Commission, *Report . . . on Salmon and Other Fish*, cited, p. 83.

³ *Ibid.* These are 1933 figures except for the Japanese domestic pack which is for 1932.

⁴ For detailed description of the spread of salmon canning, cf. Cobb, *Pacific Salmon Fisheries*, cited. It is from his standard work that most of this material has been drawn.

were being canned, with reds in the lead and chums represented by only a few hundred cases. On the coast, springs, quinnats or kings as they were variously known were the first to be packed,

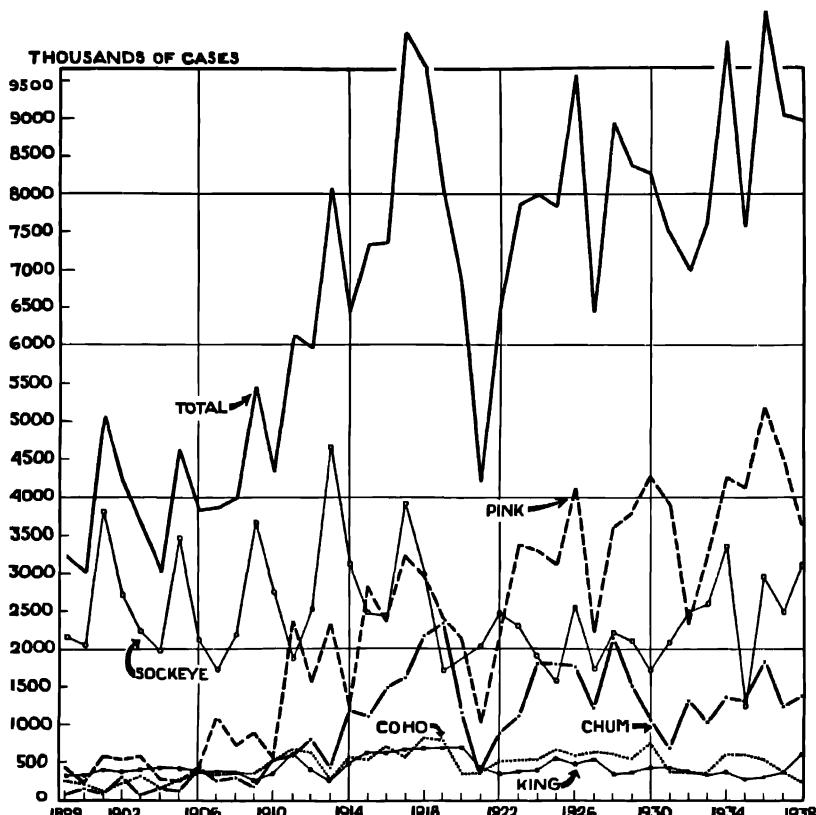


Fig. 3. North American Production of Canned Salmon by Species, 1899-1938.

Source: *Pacific Fisherman*, 1939 Yearbook, p. 85.

with the sockeye or red entering the field in 1870 in British Columbia and 1889 in the states. Silver salmon or coho came into use by 1877, chums and pinks by 1889. Steelhead was also reported as first packed in the latter year.

Thus by the close of the century all grades of Pacific salmon were being preserved in cans. Fig. 3 shows the course of develop-

ment for the packs of the five main species in North America since that time. It can be seen that the pack of kings and sockeyes is not greatly different today from what it was at the turn of the century. There has, however, been a slight increase in that of cohos; chums have greatly increased; while pinks have risen rapidly to a dominant position. In 1937 the pack of the latter species made up about half of the total, as compared with only about 13 per cent in 1899. The real shift in pink production, however, did not come until 1911, although the pack temporarily passed the million case mark in 1907. The average annual total pack of all types of salmon for the United States and Canada from 1899 through 1908 was 3.8 million cases, as compared with 3.2 million in the first year of the decade. This was a small expansion to which the gradually increasing use of chums contributed. Technological advances such as the introduction of the "Iron Chink" in 1903, also constituted a factor operating in the direction of expansion.

The next 10 years included those of the World War when the demand for canned foods increased sharply, so that it is not surprising that the average pack rose to 7.1 million cases. Chums passed the million mark in 1914 and pinks were also widely used. The period from 1919 to 1928 included the 1921 slump resulting from the overexpansion of war years, but the United States was entering the period of boom prosperity and the average pack for the 10 years rose again to 7.3 million cases. Pinks passed the three-million mark in 1923 and temporarily exceeded four million in 1926. For the next 10 years, despite the depression, the average total pack has again risen sharply to 8.5 millions, with pinks four times exceeding four million cases and in 1936 passing the five-million mark for the first time in the history of salmon packing.

With this picture of a steadily growing supply, it would seem either that conservation has not been a problem or that it has been carried on with the desired efficiency. This general survey, however, does not take into consideration the output of individual areas, the extension of the total fishing area, or the degree of escapement in the region as a whole. As will later become apparent, the supply in some regions has diminished greatly. Only the exploitation of new areas as well as the recent stabilization of

supply in Alaska—main source of salmon—has made the steady increase possible.

Before the end of the last century the necessity of some sort of protection for the fish supply was apparent to farsighted individuals. In certain streams there had already been indication of diminution in the size of the runs, and rudimentary forms of

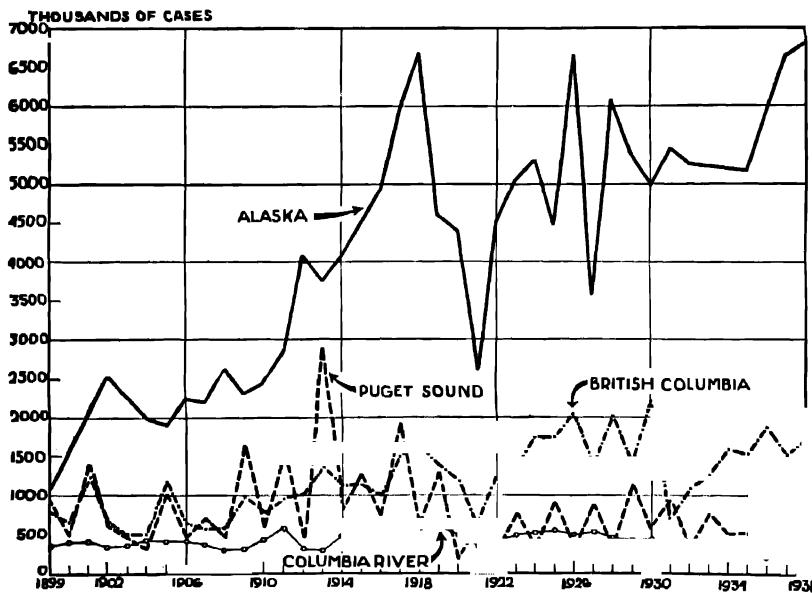


Fig. 4. North American Production of Canned Salmon by Principal Regions, 1899-1938.

Source: *Pacific Fisherman*, 1939 Yearbook, pp. 69, 81, 83, for all data except British Columbia 1899-1906, for which see John N. Cobb, *Pacific Salmon Fisheries*, U. S. Dept. of Commerce, Bureau of Fisheries, Fisheries Document no. 1092 (Washington, 1930), p. 579.

government control had already been established. The fight had begun to stem the tide of ruthless exploitation by developing adequate conservation measures and effective enforcement. Today the struggle still continues, although a great deal has been accomplished in the past four decades.

As has been already indicated, Alaska is of primary importance from the point of view of salmon supply. It far outweighs the other main regions of the north Pacific in salmon production, as

portrayed in Fig. 4. Accordingly, the details of Alaska conservation may well be considered first.

ALASKA SALMON CONSERVATION

The first Alaska salmon pack was put up at a cannery in the southeastern section of the Territory in 1878. Thereafter other canneries appeared in rapid succession in that section, in central Alaska and even in the western Bristol Bay region, so that by 1889 there were 37 canneries operating, and the pack had increased from 8,000 cases to 700,000. In that year came the first Federal legislation to regulate the salmon fisheries. Obstruction of streams up which the salmon passed was forbidden on penalty of a fine and the Commissioner of Fisheries was directed to investigate the fisheries with the aim of gathering the knowledge necessary for adequate protection.⁵ In 1892 a government agent was appointed to enforce the law and to gather fishery statistics. Meanwhile overproduction had glutted the market leading to the formation of a packers' association, an action which temporarily reduced the number of plants and the size of the pack.⁶ Other firms entered the field, however, and by 1900 42 canneries were operating and the pack exceeded one and a half million cases. The general course of Alaska cannery growth and of the pack can be followed on Figs. 5 and 6.

Bitter competition over the control of the fish supplies throughout this period led to little cooperation between the commercial interests and the government in attempts at conservation. The early regulations were poorly devised and frequently observed in the breach. There was no strong public opinion to back the enforcement of laws restricting overfishing. The reports of government agents in these early years were replete with stories of uncontrolled exploitation of the salmon runs. Practices which experts and laymen alike are now unanimous in condemning were allowed to flourish without hindrance. The territory to be regulated was

⁵ For a review of conservation legislation from 1889 to 1924 see Willis A. Rich and Edwin M. Ball, *Statistical Review of the Alaska Salmon Fisheries, Part I: Bristol Bay and the Alaska Peninsula*, U. S. Dept. of Commerce, Bureau of Fisheries, Document no. 1041 (Washington, 1928), pp. 47-52.

⁶ See pp. 93-94.

vast; the number of government agents as well as their transportation facilities woefully inadequate. Frequently the agent was obliged to depend upon the boats of the salmon canneries so that a surprise visit was impossible, and obstructions to streams, etc., could be removed in preparation for the inspection.

Another act was passed in 1896, and amended and re-enacted in 1899. This provided for some regulation of fishing, protected

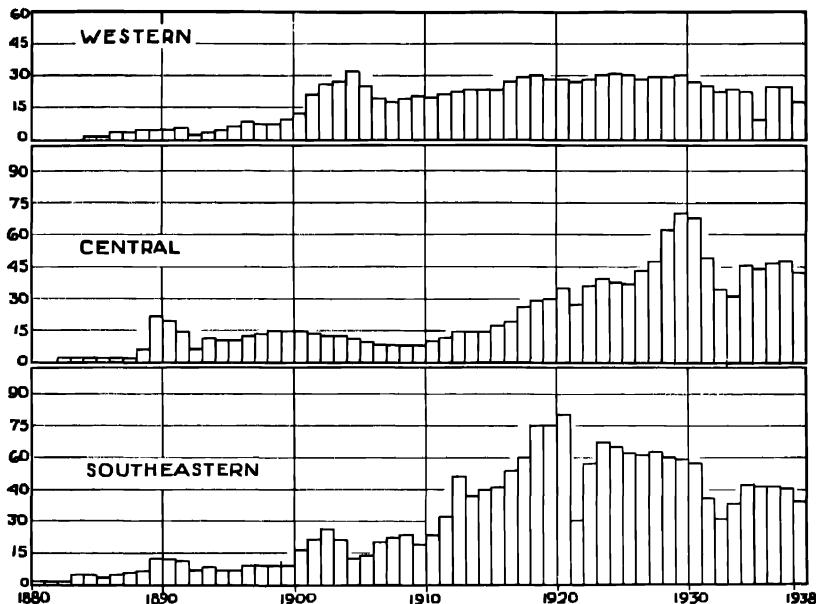


Fig. 5. Salmon Canneries in Alaska by Regions, 1880-1938.

Source: John N. Cobb, *Pacific Salmon Fisheries*, U. S. Dept. of Commerce, Bureau of Fisheries, Fisheries Document no. 1092 (Washington, 1930), pp. 572-73 and *Pacific Fisherman*, 1939 Yearbook, p. 79.

certain spawning grounds and established a weekly closed period. The subsequent reports of the agents, however, were filled with testimony to the inadequacy of the laws and their enforcement. They stressed the danger to the salmon resource from the intensity of fishing both then and earlier. "Paradoxical though it may appear it is nevertheless true, that none are more anxious to save and perpetuate the salmon than the canners themselves and yet their methods are such as, if continued, will very soon destroy

them."⁷ Again, somewhat later another agent writes: ". . . fierce competition, unrestrained by adequate laws, has been and is now operating to force packers, who cannot help but realize the suicidal policy of such a course, into practices which they must know will surely be fatal to the permanence of their interests, and which they are practically powerless to avoid."⁸ The canneries were reported as straining every nerve to exceed the previous year's pack. The plant superintendents were ordered to catch all the fish they could.

During the first decade of the twentieth century the pack for eight of the years was over the two-million mark with red salmon still predominant; the

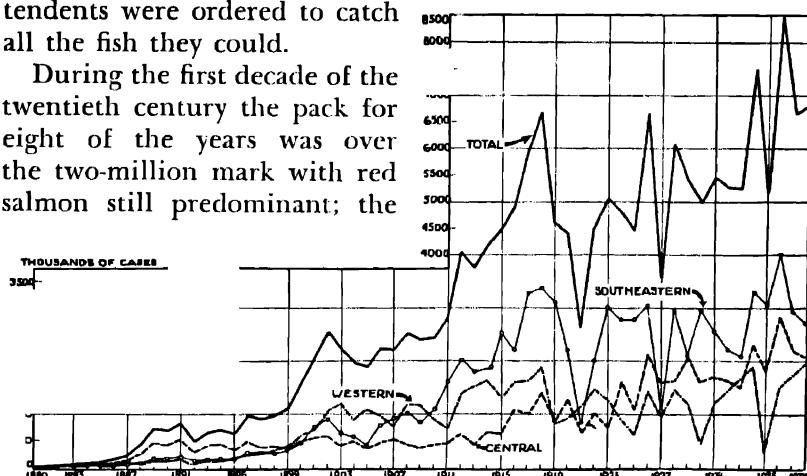


Fig. 6. Canned Salmon Pack of Alaska by Regions, 1880-1938.

Source: *Pacific Fisherman*, 1939 Yearbook, p. 79.

number of canneries varied between 45 and 64. Laws were put into effect which attempted to control methods and location of fishing, to stop obstruction of streams and to provide for closed fishing seasons in order to secure adequate escapement. Artificial propagation of fish was engaged in by the government. Subsidies were also given to packers who undertook hatchery work, as an earlier law attempting to compel them to undertake this task had proved unsatisfactory. Gradually the number of government agents in-

⁷ *Salmon Fisheries of Alaska, 1892-1905*, Reports of Special Agents, 1892-95, *Seal and Salmon Fisheries and General Resources of Alaska*, vol. 2 (Washington, 1898), p. 406.

⁸ Howard N. Kutchin, Special Agent, *Report on Salmon Fisheries of Alaska* (Washington, 1897), p. 31.

creased from the solitary individual of the 'nineties to more than 70 in 1923. These representatives of the Bureau of Fisheries watched the mouths of the streams but were hampered in their work by having neither the power to arrest nor the right to seize illegal gear.

More serious attention was given to conservation as a result of the intensified fishing occasioned by the World War. The war years and especially 1918 gave a sharp stimulus to the exploitation of salmon by bringing a tremendous demand for the product and rapidly mounting prices. In Alaska the number of canneries operating increased from 81 in 1914 to 135 in 1918, and the pack from 4.2 million cases to 6.7 million. In 1919, a report to the Commissioner of Fisheries by the special agent, Dr. C. H. Gilbert, and his assistant, Mr. Henry O'Malley, expressed the conviction "that the industry has now reached a critical period, in which the salmon supply of Alaska is threatened with virtual extinction, unless a radically new administrative policy be substituted for the one now in force."⁹

These experts pointed out that certain streams were definitely on the way to depletion and that it was erroneous to measure the output for whole areas, which were then remaining on a level of high yield only by the fishing of streams hitherto untouched. They insisted on the importance of individual stream statistics. As evidence of depletion, they described how the increase in the amount of gear used had resulted in a diminution of the catch per unit in certain localities, and vivid references were made to the "forests of nets" through or around which fish had to pass. Another factor in the situation was the "outside" fishing in salt water beyond the jurisdiction of the Commissioner of Fisheries. Studies conducted by fishery experts indicated that it might be expedient to provide for a definite 50 per cent escapement for the maintenance of the individual runs.

*The White Act of 1924*¹⁰

In 1924 the White Act was passed by Congress. It has become a landmark in conservation philosophy and technique. It recognized

⁹ Quoted in appendix to *Fish Traps in Alaskan Waters, Hearings . . .*, cited, p. 248.

¹⁰ Congressional Act entitled, *Act for the Protection and Regulation of the Fisheries of Alaska*, approved June 6, 1924, 43, U. S. Stat. at L., pp. 464-67.

scientific biological control over salmon runs, localized the regulations to fit the individual fishing conditions of each area, and placed the research and administration in charge of independent agencies. The principle of 50 per cent *escapement* was definitely written into the law. "For the purpose of protecting and conserving the fisheries of the United States in all waters of Alaska," the Act gives the Secretary of Commerce, under whom the Bureau of Fisheries operates, complete administrative authority to protect the salmon in Alaska. He may "set apart and reserve fishing areas in any of the waters of Alaska over which the United States has jurisdiction, and within such areas may establish closed seasons during which fishing may be limited or prohibited as he may prescribe. Under this authority to limit fishing in any area so set apart and reserved, the Secretary may (a) fix the size and character of nets, boats, traps, or other gear and appliances to be used therein; (b) limit the catch of fish to be taken from any area; (c) make such regulations as to the time, means, methods, and extent of fishing as he may deem advisable." All such regulations must be of general application within the particular area in which they apply and the exercise of discrimination is forbidden.

The provisions of the laws in force today make unlawful, except for Indians, the construction of any dams, barricades, traps, fish wheels or other fixed or stationary obstacle except for fish-culture purposes in any Alaska waters where the distance from shore is less than 1,000 feet, or within 500 yards of the mouth of any stream except the Yukon, Kuskokwim, Ugashik and Karluk Rivers. It is likewise unlawful to fish commercially for salmon with any gear or appliance except a hand rod, spear or a gaff in any Alaska river except the four named above. A closed period of 36 hours per week is established by law and this can be enlarged at the discretion of the Secretary of Commerce. A certain minimum distance is required between individual units of fishing gear. No salmon caught in waters outside the jurisdiction of the United States during any closed period established for the inside waters can be brought into Alaska for commercial purposes. This significant prohibition extends United States jurisdiction over the fishing of its nationals beyond the three-mile limit. Aliens formerly were prohibited from fishing in Alaska except when hired by persons or concerns legally entitled to fish. This law was amended on June

25, 1938 so as to prohibit all fishing in the Territory by aliens, except by hand rod, spear or gaff, after 1941.¹¹

It is unlawful, further, to drive salmon down stream or outside the protected area at the mouth of rivers. It is unlawful "wantonly to waste or destroy salmon or other food fishes" taken in Alaska waters. Preservation of salmon for sale as human food must take place within 48 hours after the fish have been killed. The laws likewise provide for a tax on all forms of manufactured salmon products, penalize misrepresentation of such product by labels, brands or trade marks, make special exemptions to persons maintaining a private salmon hatchery, and provide that manufacturing establishments shall turn in all such data to the Bureau of Fisheries as the latter may need for its information. Penalties are fixed for infringement of the laws or regulations and the Bureau officials have authority to arrest and to seize property in the process of enforcing the law.

The regulations issued by the Bureau of Fisheries divide Alaska waters into areas, in each of which the provisions vary according to the peculiar needs of that district. The 1937 regulations had 12 main areas with one subdivided into nine districts. In a few localities where streams are weired for computing the escapement a limit is put upon the size of catch. In all districts the gear is carefully defined as to type and size.

The reader should keep in mind the fact that the majority of these regulations have as their object the lessening of fishing intensification. Maximum escapement to the 50 per cent level is their object. There are some provisions which apply to all areas, such as prohibition of the use of explosives for catching fish and the spacing of traps, which must be at least one mile apart. Seine boats, with few exceptions, must be within a 50-foot keel length;¹² trollers must carry no more than four lines; king salmon caught by trollers, if under six pounds dressed weight, must be released from the hook without injury; staked or anchored gill nets are generally required to be set out in a straight line. In certain regions, primarily Bristol Bay, powered gill-net boats are forbidden.

Size variations in purse seines, which are prescribed by regulation, vary from 100 fathoms maximum hung length to a length

¹¹ 52 Stat. at L., p. 1174.

¹² Note the correlation between boat size and catch, p. 25.

which shall be not less than 150 fathoms and no more than 200 fathoms. In certain exposed waters of the Alaska Peninsula purse seines are not limited in size. Depth of net may be forbidden to be more than 150 meshes, or in another location extremes of 175 and 250 meshes depth may be established. Gill nets may be restricted in one locality to 100 fathoms and in another may be 250 fathoms hung length. Length and depth of beach-seine nets are also limited variously, as is the length of set nets. Floating traps in the southeastern area of Alaska are restricted to 900 feet in length if they are in water deeper than 100 feet at mean high tide.

The minutiae of detail in these regulations make confusing reading for the layman who is unacquainted with the peculiarities of each fishing area which have necessitated such widespread diversity. It must be stressed, however, that inasmuch as the fish population of each stream is a distinct and independent entity, successful conservation can only be carried on by considering the particular needs of each locality. A point especially puzzling to the layman is the establishment of a minimum size for nets in certain areas. This is to prevent the use of nets in locations where fishing is undesirable and where only small nets could be efficiently used.

It is apparent that detailed control over the fisheries is exercised by the Bureau of Fisheries through the medium of these regulations. The 1924 Act placed wide powers in the hands of the administrative officer. Such discretionary power on the part of a government agency over the raw material supply of an industry in which large private interests are concerned and one moreover in which returns on investment are in any case highly speculative naturally presents the danger of abuse. This is a familiar problem where circumstances require that the government extend its regulatory functions over private industry.

The Trap Problem

On one aspect of gear regulation—the use of traps—there are sharp lines of difference among the various groups interested in the salmon industry. Among seine fishermen, some other labor groups and sportsmen there has been a sustained movement in favor of the total abolition of salmon traps. This movement has been successful in the state of Washington but in Alaska traps are still widely used. They are an efficient fishing device and have the

further advantage of keeping the fish alive until the time comes to deliver them to the cannery. Although the numbers permitted have been reduced by the Bureau of Fisheries in the general course of gear control, traps predominate in the Alaska salmon catch except in western Alaska where they are not permitted. In 1937 trap-caught fish represented 46 per cent of the total catch in Alaska and in recent years the proportion has tended to vary between 45 and 60 per cent.

Fish-trap permits in Alaska must be obtained from the War Department to insure against the obstruction of waterways. They are of five-year duration. A yearly license must be obtained from the Territorial authorities, the fee for which is \$200 per unit; and an additional tax must be paid to the Territory on fish taken by a trap during the season in excess of an established minimum (100,000). This is essentially for revenue and only incidentally a conservation measure. Each trap must be approved by the Bureau of Fisheries as to location and requisite distance from other traps. Indeed, it is difficult today to acquire trap sites because of the limited areas open to the use of this type of gear. Good sites are closely held in practice. In describing the method by which trap locations are held a packer has stated: "It is not only first occupancy, but also continuous possession is the only way that he can hold a trap site. Regardless of what you may have paid for it, there is no way we can obtain any right or ownership to it between one year and another, except just to get out there and sort of put a fishing device on it. Under the law, they cannot put another device in under a certain distance. That is the only right we have against anybody else."¹³

The difficulty for new persons entering the field to acquire traps, combined with the costliness of that type of gear, lays the basis for the charge of monopoly control and special privilege. Traps, moreover, are important enough to account for about half the salmon catch of Alaska, even though their number has been reduced from the maximum of 799 in 1927 to 453 in 1937. From the point of view of conservation, however, the Bureau of Fisheries has taken the position that trap abolition is unnecessary. It would seem that traps are a form of gear capable of regulation as to number, location, size and methods of operation. Being fixed gear they are relatively

¹³ *Fish Traps in Alaskan Waters*, cited, p. 149.

easy to control. Their efficiency makes them very destructive to the fish population, however, if not regulated. Generally speaking, traps may be considered as a labor-saving device with the customary attendant faults and virtues. Their use, moreover, is circumscribed by prerequisites of financial backing and priority in the field.¹⁴

In addition to the White Act establishing the principle of 50 per cent escapement and such regional regulation as the Secretary of Commerce may deem necessary to achieve such escapement, there has been one other main shift in conservation technique. As previously observed artificial propagation and distribution of young salmon through hatchery work was advocated in the early years. This is no longer the case. There are no hatcheries now in operation. The general view is that with the more or less natural conditions still prevailing in the Territory the use of artificial means in building up the runs is not only unnecessary but also impractical. The attendant expense is regarded as disproportionate to the benefits derived. As will appear later, this view also accords with the present belief and practice in British Columbia. Adequate escapement is the keynote of present conservation. It should be noted, however, that while the escapement should be adequate, too great an escapement is inadvisable as it results in what is technically known as overseeding with possible destruction of the spawn. Thus fishing to the escapement limit may possibly be of value to the runs.

Condition of the Alaska Runs

In the light of the foregoing it is of interest to examine the trend of the pack in different species of salmon in the various Alaska districts. These production figures are of course influenced by several factors of which the fish supply is only one. The demand for the finished product and the development of industrial and business techniques also condition the size of the pack. Moreover, so long as there are new areas to be fished it is possible for the total supply to maintain a high level even though certain sections may be undergoing serious depletion. Once the point is reached when no

¹⁴ The various aspects of the "trap problem" have made it necessary to introduce the subject at several points in our study. For further discussion, see pp. 21-23, 63-64, 83, 87-88, 99, 107, 116-17, 123.

more new areas exist, however, too great an intensity of fishing will be readily observable in the depletion of the fish supply. The fish which escape up the rivers spawn the next generation of salmon which in two to seven years, depending on the species and locality, will be available for the canneries as they in turn come back to spawn.

It is safe to assume that in recent years there has been a general tendency in the industry for the catch to approximate the supply afforded by natural conditions and government regulation. Under such circumstances the trend of the salmon pack over a long period of time would indicate the condition of the runs. It is doubtful, however, whether the industry has been long enough established for the actual historical trend to be so interpreted, particularly in view of the different stages through which the industry has passed—species expansion, geographical expansion, the heavy demand of the war years, the post-war slump, the new conservation policy following 1924, and the years of the late depression. The time span hardly seems great enough to iron out all the effects of these diverse influences on the pack and to make the trend of the pack really a criterion of basic supply. Examined closely, however, the pack charts (Fig. 7) do present evidence to back up the contention of the experts that the Alaska salmon runs, generally speaking, are in a satisfactory condition today.

Judging by Fig. 6, the general trend of Alaska canned salmon production is definitely rising. The early years of more or less natural expansion of the industry were followed by the sharp rise of the war years, when expansion received the impetus of suddenly increased demand. The climax came in 1918, followed by a sharp decline to the 1921 low. As has been related, these were years of unsatisfactory regulation of fishing, when the depletion of individual runs was offset by new sources of supply.¹⁵ The year 1924 with its new legislation marks a turning point in the history of the Alaska salmon runs, following which only such amounts of salmon have presumably been caught and canned as will permit an adequate escapement to the spawning grounds. The trend of the

¹⁵ For a detailed analysis of the years prior to 1928 see Willis A. Rich and Edwin M. Ball, *Statistical Review of the Alaska Salmon Fisheries*, in four parts, U. S. Dept. of Commerce, Bureau of Fisheries, Docs. nos. 1041, 1102, Bulletins nos. 7, 13 (Washington, 1928, 1931, 1932, 1933).

pack in the years that have followed is upward, despite a serious decline in 1927 when the runs were poor. There was also a drop in 1935 which can be largely accounted for by the virtual closing of Bristol Bay to commercial operations by the Bureau of Fisheries. The greatest pack ever produced, however, came in 1936, exceeding by nearly a million cases the record established in 1934. The 1918 peak was also closely approached in 1937, and passed in 1938. In the 15 years since its passage the White Act seems to have justified itself. It has made possible an even greater production of salmon than previously, yet this has taken place despite the restrictions imposed to ensure proper escapement, and therefore presumably without jeopardizing the future.

Again, from Fig. 6 it can be seen that the same general conclusion applies to the southeastern and central districts of the Territory. Southeastern Alaska has been the greatest of the three districts as a contributor to the Alaska salmon pack for over 25 years. Central Alaska is next most important in volume of pack, although it has only held that position since 1924. If the respective packs are judged by rate of growth rather than absolute amount, a sharper rate of increase is observable for the central district since 1924 than for any of the others or for Alaska as a whole. For both areas, however, production has followed a rising curve, despite government restriction, and this increase is not attributable primarily to the tapping of new sources of supply.

In the case of western Alaska the picture is somewhat different. Here production approached its maximum potentialities much earlier than in the other districts. This is understandable when it is recognized that the western pack is predominantly red salmon, the species at first most generally used. The possibilities of further expansion in this region, therefore, were not so great during the period of war demand. In the 1919 report mentioned earlier it was stated that the red salmon runs in Bristol Bay were in danger of decline if the scale of operations continued, and this prophecy was borne out in the ensuing decade.

The trend of the pack is more difficult to judge in the case of this district owing to the appearance, since the World War, of a recurrent sharp drop in one of the cycles. It is useful, therefore, to examine the pack figures for western Alaska over five-year

periods. From 1911 to 1935 they were as follows (in standard cases):

1911-15.....	6,588,465
1916-20.....	6,750,528
1921-25.....	5,408,880
1926-30.....	5,464,572
1931-35.....	6,404,740

It can thus be seen that in the last complete five-year period the pack was once more approaching the peak reached during

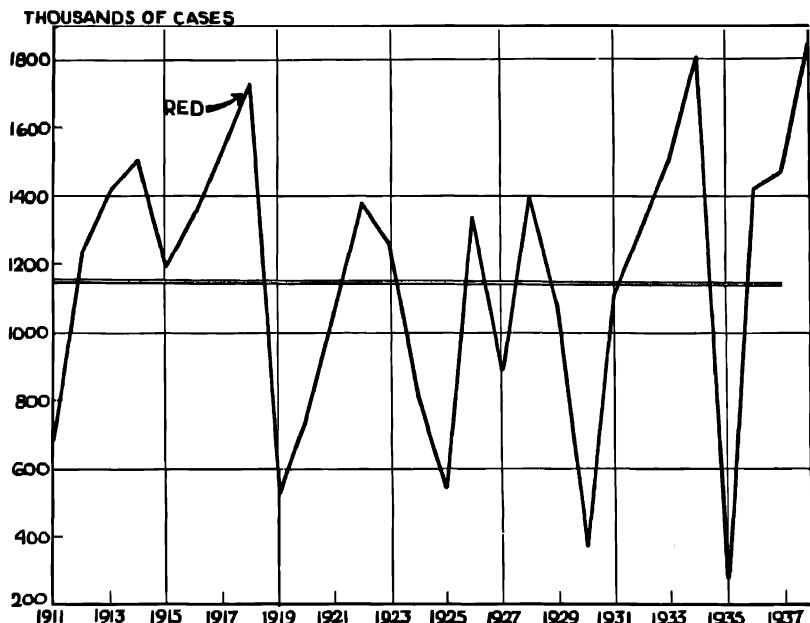


Fig. 7. Canned Salmon Pack of Alaska Regions by Principal Species, 1911-38.

A. Western Alaska.

Source: *Pacific Fisherman*, 1939 Yearbook, p. 79. The trend line has been calculated only for the period 1911-37.

the war years, after a decline in the post-war decade. For the three years following 1935, moreover, the pack has been higher than for the corresponding three years following 1930. It appears that the ravages of the war period are being overcome, and that the runs are now in better condition. It is also believed that the

semiclosure of Bristol Bay in 1935 will have helped to rehabilitate that particular run, which, as Fig. 7A reveals, has been well below average for a quarter of a century.

In order to carry the analysis further, the pack of the different species in the various districts must be examined. In Fig. 7 the course of the pack for the main species in the three Alaska regions is shown. In western Alaska red salmon composes almost all the

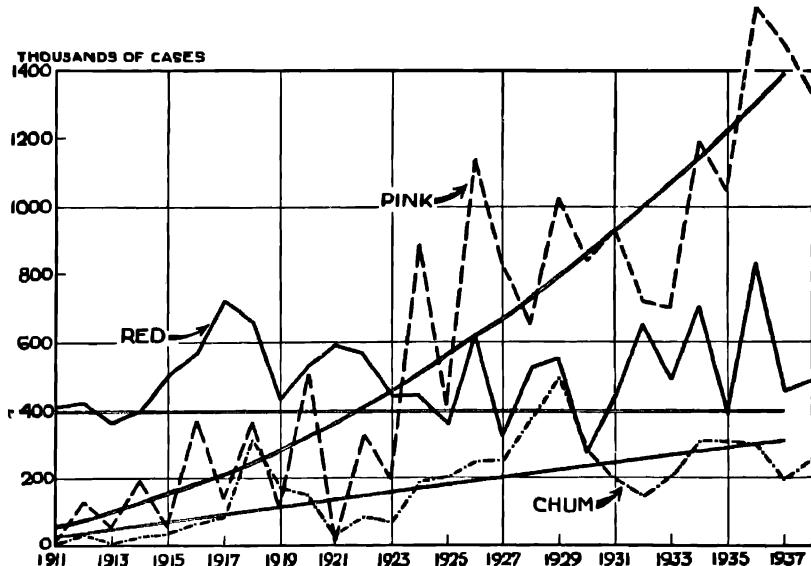


Fig. 7. Canned Salmon Pack of Alaska Regions by Principal Species, 1911-38.

B. Central Alaska.

Source: *Pacific Fisherman*, 1939 Yearbook, p. 79. The trend lines have been calculated only for the period 1911-37.

pack, and it is evident that with the exception of the 1925, 1930, 1935 runs the pack of this species has been on the increase since 1924. In fact, the year 1938 established an all-time peak. Small amounts of the other species, kings, chums, pinks and cohos, are also packed, but are not considered of great importance in this region either by the salmon packers or the Bureau of Fisheries. The trend in kings and pinks has been downward since the war years.

In central Alaska the trends of the packs of the three leading

NORTH PACIFIC FISHERIES

species (pinks, reds and chums) have been definitely upward since pre-war times. The greatest increase is in pinks, the trend line for which shows an advance from 60,000 cases in 1911 to 1,400,000 cases in 1937—an increase of over twenty-fold. (See Fig. 7B.) The rise has been a steady one in which the war expansion does not play as large a role as in the case of so many of the Alaska packs.

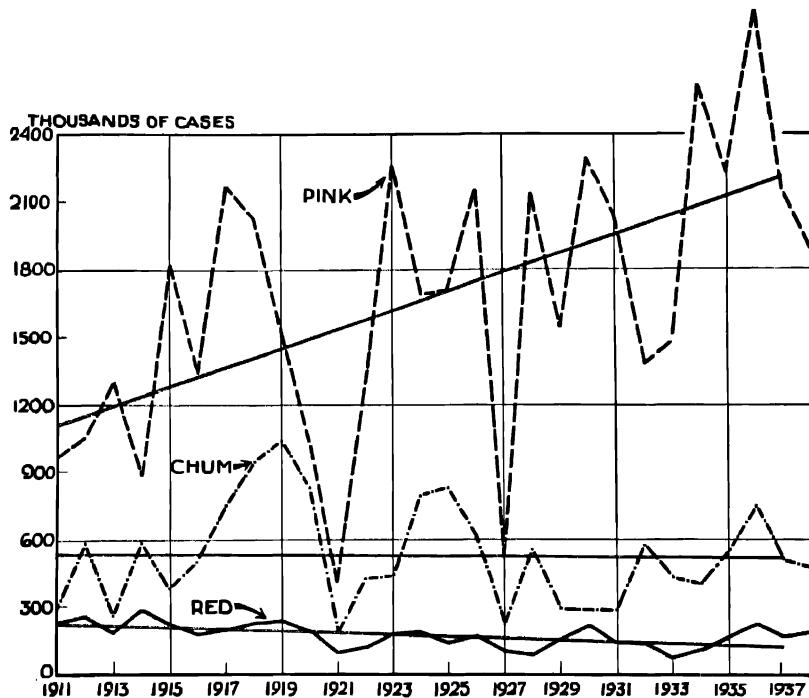


Fig. 7. Canned Salmon Pack of Alaska Regions by Principal Species, 1911-38.

C. Southeastern Alaska.

Source: *Pacific Fisherman*, 1939 Yearbook, p. 79. The trend lines have been calculated only for the period 1911-37.

For reds the pack trend was downward during the 'twenties with an improvement in the past decade. The drop in the 1925, 1930 and 1935 red runs, so obvious in the western district, is likewise to be noted in the central Alaska fishing grounds. Chums show a rise in the trend line from 63,000 cases in 1911 to 320,000 cases in

1937—a four-fold increase. This species again follows the general pattern of a rise in the war years followed by a slump, with an increase to even higher levels since the advance in conservation.

Here as elsewhere in Alaska the king and coho packs are not of great importance. As in the case of the reds, the king pack started at a higher level in 1911 than that of pinks, which species only came generally into use following that time. The rise in trend is thus not as sharp as for the pale-colored fish. However, the average pack has been higher since 1924 than it was in preceding years.

In southeastern Alaska pinks are preponderant. They show a rise in the trend line from approximately 1,111,000 cases in 1911 to 2,220,000 cases in 1937, or an increase of practically 100 per cent in the 26 years. The serious decline of the 1921 pink pack is to be accounted for on the basis of a collapse of the salmon market and also by an unexplained biological condition that produced short runs. The poor runs in 1927 and the consequent early closing of the fishing season by the Bureau of Fisheries in order to forestall serious depletion explains the drop in the pack of that year. By comparison with reds, the pinks possessed larger potentialities of expansion 30 years ago due to their later general use, but a rise is discernible even from the level reached in the war years. The pack in 1937 and 1938 has shown some decline but more stringent regulations have been introduced for the 1939 season which should improve the runs. Chums on the other hand have not regained their wartime level although their post-war decline seems at least to have been checked. (See Fig. 7C.)

It is the reds in this region which show the most disappointing pack trend. The peak for the pack was established before the war expansion and while there are recent indications of improvement it cannot yet be said definitely that the decline has been reversed. The coho pack is somewhat smaller than the reds, while the kings have never constituted more than a negligible part of the total southeastern pack. For both of these species the pack line is not a good criterion of the runs due to their use in other forms of processing.

It may be concluded from this survey of districts and species that the past 15 years have witnessed substantial progress in the rehabilitation and stabilization of the Alaska salmon supply. The total pack has expanded appreciably, and this expansion has taken

place without damaging the potentialities of future growth, according to the best information. Whatever improvements may still be effected, the evidence suggests that the present conservation program in Alaska is moving towards the desired goal of maximum use with a guarantee of permanence.

IV

SALMON CONSERVATION ON THE PACIFIC COAST (continued)

SALMON CONSERVATION IN THE STATE OF WASHINGTON

THE FIRST salmon cannery in Washington was established on the Columbia River in 1866. In 1877 Puget Sound first became the scene of operations and by 1900, 19 canneries were operating there. The first pack was put up in Grays Harbor in 1878, and at Willapa Harbor in 1886, while the coastal streams of Washington were not exploited until much later. The pack from these three last named regions has always been small and in only one year—1911—has it ever exceeded the 100,000 cases mark. In 1938 it only amounted to 14,732 cases, indicating a steady impoverishment of the runs. Puget Sound and the Columbia River, then, have been the two main centers of Washington salmon canning activities. All species are represented in the pack of the former, while the chinook is predominant on the Columbia River.

Administrative regulation of salmon was begun in Washington even before the introduction of canning. In 1856 an act supervising the quality of product was passed by the Territory which authorized the county commissioners to appoint an inspector of salmon. In 1877 a commission was established to aid in preserving the Washington fisheries. H. H. Bancroft in his *History of Washington*, published in 1890, states, "The territory has by legislative enactment endeavored to save the salmon product, it being unlawful to place traps, or other obstructions, across streams without leaving a chute for the passage of fish."¹

With the advent of statehood in 1889, more measures were taken for salmon protection. These were followed by various laws which (a) prohibited the pollution of streams, (b) barred the use of explosives to catch fish, (c) created fishways where obstructions

¹ Hubert Howe Bancroft, *History of Washington, Idaho, and Montana, 1845-1889* (collected works, vol. 31, San Francisco, 1890), p. 348.

to streams occurred, (d) provided fish hatcheries for rebuilding depleted supplies, and (e) regulated the location, size and distance between fixed fishing gear. As a part of the restrictions on locations and gear instituted in the 1900's, the establishment of closed periods developed. At that time also was established the right of operators, upon the filing of a claim, to possessory rights over sites for set-nets, traps, etc., in perpetuity. The operator had to secure a license for the appliance which was constructed each year with forfeiture for nonuse, and the trap owner was required to pay a property tax on the location.

The state of Washington has followed a dual course of salmon preservation. It has sought to regulate fishing intensity, while at the same time counteracting depletion by artificial propagation. The first hatchery was built in 1895; in 1936 there were 14 in operation. In the present law 50 per cent escapement for the salmon runs, the rule in Alaska, is not formally declared as the basis of policy. It is an aim which the Fisheries Department nevertheless attempts to approximate, although the state has no facilities for counting the runs.

The basic fishery regulations of Washington are contained in the Annotated Laws relating to Food and Shell Fish. The code states: "The food fishes in the waters of the State of Washington shall be preserved, protected and perpetuated, and to that end such food fishes shall not be taken at such times or places by such means or in such manner, as will impair the supply thereof."² To the Director of Fisheries is given the power "to investigate the habits, supply and economic uses of, and to classify, the food fishes in the waters of the State of Washington, and from time to time, make, adopt, amend, and promulgate rules and regulations governing the taking thereof."³ Such regulations may fix closed periods for fishing, specify closed fishing areas, and define the types of gear to be used as well as the time, place and manner of use. For regulatory purposes the state is divided into four fishing areas.

As regards salmon, the law prescribes a closed season for the Columbia River and for parts of Puget Sound, except that in the

² State of Washington, *Annotated Laws Relating to Food and Shellfish, 1936*, compiled by B. M. Brennan, State Director of Fisheries (Olympia, 1936), p. 5.

³ *Ibid.*, p. 7.

latter place hook and line are permitted at all times. On the Columbia River gill nets are limited to 250 fathoms in length. Drag seines are forbidden as are any fixed gear, traps, fish wheels and set nets in all waters over which the state has jurisdiction. All salmon must be canned within 60 hours after taking, unless artificially chilled. There are also provisions regarding the construction of fishways over dams in salmon streams, the screening of irrigation ditches, and the prohibition of pollution of streams and the use of explosives for catching fish.

The regulations give detailed instructions regarding places open to salmon fishing, the type of gear to be used, the time in which fishing is permitted, and the minimum size for salmon which may be caught. A maximum size for nets is established for the state as a whole, with smaller sizes set for certain specified localities. River fishing is restricted, but not to the same extent as in Alaska. Certain streams can only be fished below tidewater, in others commercial fishing is forbidden entirely.

A point of particular interest in the Washington laws governing salmon fishing and conservation work is the prohibition of traps.⁴ The agitation against traps which resulted in the law (Initiative 77 of 1934) abolishing them was a movement supported mainly by sportsmen and purse seiners. Traps were numerous in the state—630 were licensed in 1934, the last year of their existence, although not all were worked. For the years 1926-30 trap licenses had run in the eight hundreds. The proportion of the catch taken by traps in 1934 was somewhat less than a third, although for certain regions and for certain species of fish the proportion was much higher.

Charges were made of depletion of salmon runs and of monopoly control of the trap gear. As can be seen from Fig. 4 considerable diminution of the salmon catch in the Puget Sound area had indeed taken place. The canning concerns, moreover, had naturally attempted to ensure their supply of raw material, for which purpose traps were admirably suited, and the cost of this type of gear inevitably gave an advantage to the operators with financial backing.

The necessity for some curtailment of fishing if the runs were

⁴ For other discussion of traps, see pp. 21-23, 51-53, 83, 87-88, 99, 107, 116-17, 123.

to be built up seemed obvious, and the abolition of traps was accompanied by the restriction of net fishing in certain areas of Puget Sound and in the rivers flowing into it. It is at least debatable, however, whether curtailment of trap fishing rather than the complete abolition of that form of gear might not have been adequate from a conservation point of view. As noted above, this was not the sole question at issue.

From the figures available for the years following 1934 it is apparent that there has been a diminution of the salmon catch,

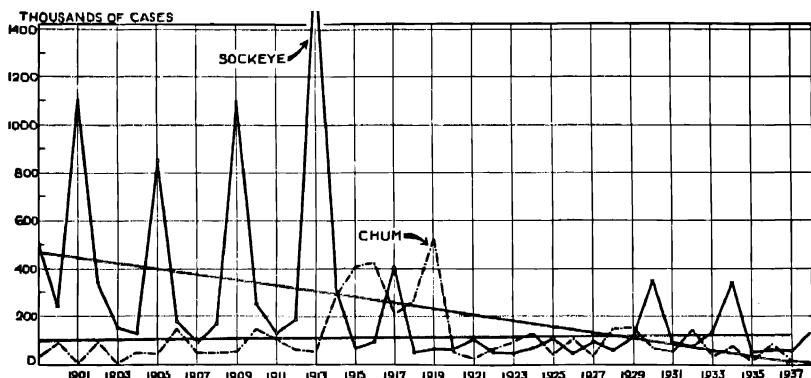


Fig. 8. Canned Salmon Pack of Puget Sound by Principal Species, 1899-1938.

A. Sockeye and Chum.

Source: *Pacific Fisherman*, 1939 Yearbook, p. 83. The trend lines have been calculated only for the period 1899-1937.

particularly on Puget Sound. (See Fig. 8.) Moreover, while the important sockeye catch on Puget Sound has decreased, the pack of Canadian fishermen who operate on the same runs has increased, as will be shown later. The American packers, who formerly depended largely on the traps for their fish supply, are apt to see nothing but harm resulting from their abolition and attribute to this cause the shutting down of several of the largest canneries on the Sound. The development of the Puget Sound canneries may be seen on Fig. 9. It should be noted that the heavy runs of pink salmon come only in odd years; hence canneries were

21 in 1927 and 22 in 1929, but only 14 in 1928. The canneries numbered 45 in 1917, but only 21 in 1927, 19 in 1933 and 21 in 1934. In 1937 and 1938, 13 canneries were reported. The claim is made in some quarters that the abolition of traps has resulted in larger escapement of fish, a desired result, although this is countered by the charge that in a few instances overseeding has resulted. It is difficult to pass final judgment on the results of this legislation until more time has elapsed in which to study its effect.

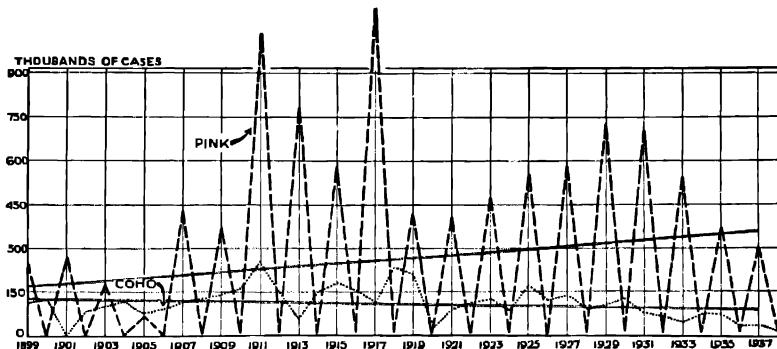


Fig. 8. *Canned Salmon Pack of Puget Sound by Principal Species, 1899-1938.*

B. Pink and Coho.

Source: *Pacific Fisherman*, 1939 Yearbook, p. 83. The trend lines have been calculated only for the period 1899-1937.

The issue again arose in the 1939 session of the state legislature, but efforts to lift the ban have thus far proved unsuccessful.

Observing Fig. 8 in which the packs of the individual salmon species on Puget Sound are given, a startling decrease in the pack of sockeyes can be noted since the beginning of the century. A rock slide in 1913 on the Fraser River in British Columbia seriously injured the heavy run which had been appearing every four years. The general diminution, however, is also attributable to overfishing. More consideration will be given later to the Puget Sound sockeye when the British Columbia aspects of this fishery are taken up.

The use of the chum species increased in the first decade of this

century and rose to a high point during the war years. Following that time it dropped sharply, and recent years have seen a definite decline. Similarly, the tendency of the pink pack is downwards

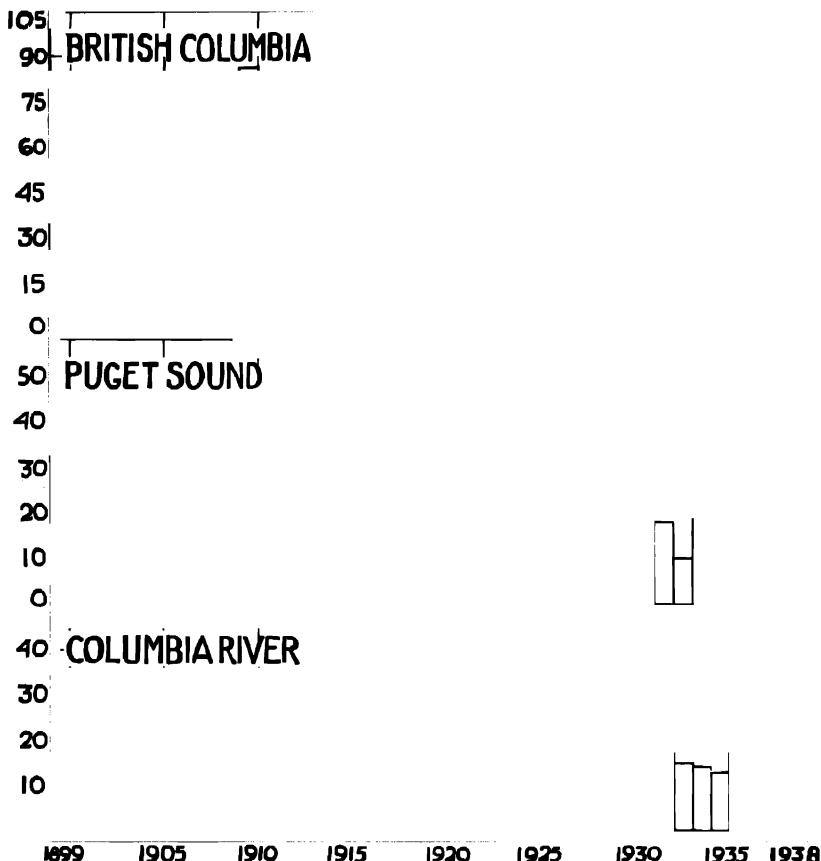


Fig. 9. Salmon Canneries in the Pacific Northwest, 1899-1938.

Source: *Pacific Fisherman* Yearbook Numbers 1930-39 except for British Columbia canneries 1899-1928, for which data see John N. Cobb, *Pacific Salmon Fisheries*, U. S. Dept. of Commerce, Bureau of Fisheries, Fisheries Document no. 1092 (Washington, 1930), p. 579.

rather than up in the past decade. The appearance of pinks in this region only every other year is graphically pictured here. The coho runs on Puget Sound also seem to be following a general de-

cline. This pack likewise showed an expansion through the war years, a certain amount of recovery after the post-war slump, and since then a fairly steady fall.

The Puget Sound runs would thus seem to be in a poor condition, in marked contrast to those of Alaska. It is too soon to tell whether the trap abolition and other recent measures will be able to rehabilitate the salmon supply of this region. For the sockeye, at least, real hope may now be entertained, owing to the recent ratification of the sockeye convention by the United States and Canada. As will be detailed later, this treaty looks to the establishment of a joint system of conservation in this area under an international commission.

SALMON CONSERVATION IN THE STATE OF OREGON

Before turning to a consideration of the Columbia River runs, the conservation measures enacted by the state of Oregon may be briefly considered. Salmon canning developed on the Oregon shore of the Columbia River before 1874. The first plant on the Oregon coastal streams was opened in 1877, and others followed. The pack on these smaller streams, however, has at no time been large. Of recent years it has dwindled until in 1937 a mere 2,400 cases were put up at one plant and in 1938 there was no operation at all. Columbia River is the center of Oregon's salmon operations.

In this state regulation of the size of mesh to be used in salmon nets and the establishment of a weekly closed period was provided as early as the middle of the 'seventies. A salmon hatchery was also established in 1876 as a result of the failure of the runs. However, this was a matter of individual enterprise rather than of state policy. It was only in 1887 that provision was made for a State Commissioner of Fisheries. In 1883 the pack of canned salmon on the Columbia River had reached a peak only to be exceeded once in its later history—in 1895. The years following 1883 showed a decline in the pack which was attributed by observers to overfishing. Bancroft in his *History of Oregon* comments as follows: "Nature does not provide against such greed, and it is doubtful if art can do it. The Government, either state or general, should assume control of this industry by licensing a certain number of canneries, of given capacity, for a limited period, and

improving the hatcheries. Otherwise there is a prospect that the salmon, like the buffalo, may become extinct."⁵

Following the appointment of a Fish Commissioner, Oregon salmon conservation proceeded along lines similar to those of Washington, with regulatory statutes and with restocking of streams from state and Federal salmon hatcheries. At the present time the fishing regulations⁶ stipulate the fishing seasons and the type and size of gear that may be used for all the waters of the state. Traps, for example, may be operated on the Columbia, but not in any streams south of this river. Certain areas are closed entirely to fishing. Others are restricted only for portions of the week. There are detailed provisions to prevent use of explosives in fishing waters, and to prevent pollution and obstruction of streams. Irrigation ditches are required to be screened. It is illegal to waste fish, and unlawful for salmon to be sold, canned or preserved later than 60 hours after capture unless the fish has been artificially chilled.

Under a compact between the states of Washington and Oregon and approved by the Federal government, the laws and regulations of the two states have concurrent jurisdiction over the Columbia River where it forms their joint boundary.

As can be seen from Fig. 9, the number of canneries at the present moment on Columbia River is less than at any other time since the beginning of this century. The peak of cannery operations was in the 1880's; the trend of the Columbia River pack is downwards. The high level attained in the 'eighties and again in the 'nineties was followed by a long low period. Expansion again took place in the war years, and there was also the 1921 slump observable in so many of the runs. (See Fig. 4.) The period since the war has seen a decline in the size of the pack to the level of the early 1900's.

This decline is all the more serious as the Columbia River is the main source of the valuable chinook salmon. The problem is at present complicated by the building of great dams for power and irrigation. It is believed by authorities that the problem of taking the spawning fish over these obstructions or of diverting

⁵ Hubert Howe Bancroft, *History of Oregon, 1848-1888* (collected works, vol. 30, San Francisco, 1888), p. 758.

⁶ *Oregon Commercial Fisheries Code, 1937-1938* (Portland, undated).

them to tributaries of the river has been solved in a manner that gives hope for the continuation of the runs although definite information about the downstream migrants has not yet been obtained. There are, however, other adverse factors such as damage to seeding grounds and predatory fishing practices by noncommercial elements. Moreover, the problem is complicated by the difficulty of interstate cooperation.⁷ At present a movement is under way to establish a policy of interstate regulation and conservation similar to that finally adopted by Canada and the United States in regard to the Puget Sound-Fraser River sockeye, but it has yet to materialize in any concrete action.

SALMON CONSERVATION IN THE STATE OF CALIFORNIA

California is a noteworthy object lesson in the importance of conservation. The California catch of salmon has declined drastically, despite early regulations and present conservation laws which control the offshore trolling. Salmon canning was once carried on in this state but now no salmon canning industry exists, and the mild-curing of salmon for which the species predominant in California is particularly suitable is declining in volume. Writing of the canning industry before 1890, Bancroft states that "profits are becoming less and more uncertain. . . . The laws for protecting the fish . . . are little respected. . . ."⁸ The 1934-36 report of the California Division of Fish and Game states that "California's salmon fishery, the oldest and once the most important fishery in the state, continues to decline and it is inevitable that our two species, the king and silver, will become commercially extinct in California unless more protection is given them."⁹

The one cannery on the Sacramento River in 1864 had multiplied to 21 by 1883, and it was in the first three years of the 'eighties that the pack reached its peak of about 168,000 cases for 1881-83. At no other time did it pass the hundred thousand mark and long before the end of the last century the number of can-

⁷ Cf. Lewis Mumford, *Regional Planning in the Pacific Northwest* (Northwest Regional Council, Portland, Oregon, 1939), pp. 13-14.

⁸ Hubert Howe Bancroft, *History of California, 1860-1890* (collected works, vol. 24, San Francisco, 1890), p. 82.

⁹ State of California, Dept. of Natural Resources, Division of Fish and Game, *Thirty-fourth Biennial Report for 1934-1936* (Sacramento, 1937), p. 47.

neries had fallen below 10. In 1895 there were 3, in 1920 one, and in the latter year packing on the Sacramento River ceased altogether. There were also one or two canneries on other California salmon streams, but their pack was always small and has disappeared in the last decade.

Conservation began before 1870 and has been carried on both by regulation of fishing and fish-culture work. Regulations have included the usual provisions against use of explosives, against obstructions and pollution of streams, for the screening of ditches, etc., which attempt to offset the depredations of man-made civilization. At the present time there are also detailed gear and seasonal limitations differing in the many districts into which California has been divided for conservation purposes. Regulations of ocean fishing include a minimum size for the fish that may be caught and also closed seasons for fishing in these outer waters.

Decline of the salmon runs is attributed in large measure to the ocean fishing. The present closed season took a long time to enforce and is still considered insufficient. Real protection of the salmon is not afforded, according to the state authorities, as "too large a portion of the run is caught before the salmon can get in the [Sacramento] river. What is needed is an earlier closing of the outside seasons."¹⁰ In addition to the fall in the size of catch, the California fishery authorities also point to a decline in the egg take at the spawning stations as evidence of depletion.

SALMON CONSERVATION IN BRITISH COLUMBIA

In British Columbia fishing activities are not controlled by the province but by the Dominion government. The basis for all Canadian fishery control is the Dominion Fisheries Act, as amended in 1935, which lays down general requirements for fishing throughout the Dominion. Under its authority, special fishery regulations for the province of British Columbia have been enacted, beginning in 1889. These give detailed fishing regulations for the province.¹¹ British Columbia, as already stated, has

¹⁰ *Ibid.*, p. 49.

¹¹ For text of the Fisheries Act and the Fishery Regulations, see *Office Consolidation of the Special Fishery Regulations for the Province of British Columbia together with the Fisheries Act* (Ottawa, 1937).

the right to control fish canning and cannery operations and thereby possesses at least an indirect form of control.

As has been stated earlier, salmon canning began in British Columbia in 1870, and by 1900, 69 canneries were in operation. The first had been built on the Fraser River, but in the 'eighties construction began in other locations. It was not until the turn of the century, however, that all species of salmon came to be used in the province canneries, and as in other regions the catch of pinks and chums was not large until after 1910. The course of cannery development since the end of the last century can be seen in Fig. 9 and the trend of the total pack in Fig. 4.

Prior to the 1900's salmon fishing in British Columbia was confined almost entirely to drift gill-net fishing. Competition with the Americans for the Fraser River run was then becoming active and the authorities were induced to permit greater leeway as regards gear. Traps have always been small in number, however, and have been confined mostly to the Strait of Juan de Fuca. In 1937 five were licensed.

All forms of salmon fishing, including trolling, are operated under a strict licensing system. There is strict control of fishing outside territorial waters; no one is allowed to clear Canada to fish if fishing is prohibited in the territorial waters opposite or nearest to the place outside, and no fish caught outside at such times can be brought into Canada.

There is also regulation of size of gear, fishing location and season, as well as the customary regulation regarding obstruction and pollution of streams, dynamiting, etc. No salmon of less than three pounds can be caught in commercial fishing, and salmon may not be driven outside fishing areas. Fish hatcheries were begun in 1884. By 1927, 2,288 million fry were planted in the waters of the province. Recently it has been decided, however, that the additional spawning brought about by artificial propagation does not appear to be commensurate with the cost where natural spawning is guaranteed to be fairly successful by environmental conditions, and hatchery work has been virtually discontinued. This development, it may be noted, is in line with the policy followed in Alaska, where there has likewise been little change in the natural conditions under which the fish spawn, as contrasted

with Washington, Oregon and California, where civilization has made inevitable inroads.

Observing the trend of the British Columbia pack on Fig. 4, a general upward movement is evident. There was the war expansion and the 1921 drop, as in the American packs. The ensuing decade witnessed a rising trend followed by another marked drop in 1931 which was absent in the American pack. Since that time has come a measure of recovery, although not to the level of the late 'twenties. One of the main problems of conservation in British Columbia concerns the sockeye runs on the Fraser River. An adequate solution here requires cooperation between the United States and Canada, as the fish pass through American waters on their way to the spawning grounds in the Fraser River system. We now turn to this issue.

INTERNATIONAL REGULATION

As early as 1892 a joint commission was appointed to investigate the conditions of the fisheries in the territorial and contiguous waters of Canada and the United States from the point of view of their conservation. The report of the commission made in 1896¹² endorsed the application of the more stringent Canadian regulations to the American fishing of the Fraser River runs, but also reported that the runs were in good condition. No action was subsequently taken. American fishing became more intense toward the close of the century, however, and from 1902 on the question of the Fraser sockeye was a continual matter of concern.

The Canadians felt that the Americans were largely to blame for the subsequent decline in the runs due to their inadequate regulations. The Americans charged that the Canadians did not observe their own regulations. During the 1900's there was much discussion, and after conferences between Canadian and United States commissions improved regulations were adopted both by the state of Washington and by Canada. This did not solve the problem, however, and the question remained at issue.

The joint interest of the two countries led to a consideration of uniform and common international regulations in 1908, when

¹² U. S. State Department, *Report of Joint Commissioners Relative to the Preservation of Fisheries in Waters Contiguous to the United States and Canada*, Feb. 24, 1897 (H. doc. 315, 54th Cong., 2nd sess., in vol. 58, 3534).

another commission was appointed to investigate all the boundary fisheries. Regulations were proposed for the adjoining waters between Washington and British Columbia which laid down specifications concerning the size and location of gear and a closed season, as well as general provisions regarding pollution of waters, taking of immature fish, etc.¹³ Canada enacted legislation to put the regulations into effect. American operators demurred, however, and pressure on Congress resulted in the matter being shelved. Canada consequently repealed its legislation.¹⁴ An important element in the situation was the fact that international regulation was necessarily a matter of Federal jurisdiction under the Constitution, and hence would involve the entry of Federal authority into the fisheries of the state of Washington. The principle of states' rights found many ardent champions.

Writing of the following years, John N. Cobb in his *Pacific Salmon Fisheries* comments on the situation as follows: "Several abortive attempts have been made by the authorities of Canada and British Columbia on the one side and the State of Washington on the other to arrive at some equitable method of protecting this sockeye run. The former especially have professed an earnest desire to do something along this line, and there is no reason to doubt their sincerity. On the American side a few people, and among these a few of the more intelligent cannerymen, pleaded for the enactment of laws that would adequately protect the salmon, but they were overborne by the great bulk of the packers and fishermen who, disregarding all the warnings and teachings of experience, insisted upon going ruthlessly forward with the slaughter, and when reproached with their shortsightedness clamored for the establishment of more salmon hatcheries, as though the latter could accomplish the miracle of increasing the supply of fry from a steadily decreasing supply of eggs."¹⁵

In 1918 another joint commission started work in an effort to settle the various fishery disputes between the two countries. Part of its findings resulted in the recommendation of a Convention for the Protection, Preservation and Propagation of Salmon,

¹³ *System of Uniform and Common International Regulations for Protection and Preservation of the Food Fishes in International Boundary Waters of the United States and Canada*, Feb. 2, 1910 (H. doc. 638, 61st Cong., 2nd sess., in vol. 131, 5834).

¹⁴ Cobb, *Pacific Salmon Fisheries*, cited, p. 504.

¹⁵ *Ibid.*, p. 507.

which provided for an International Fisheries Commission to investigate the conditions of the salmon and for regulations to protect the sockeye.¹⁶ The regulations were to remain in effect for eight years and thereafter until such time as either country should signify desire for revision which should be accomplished by the Commission. The treaty was not adopted, but continuous agitation was carried on by various farsighted and public-spirited individuals for the conclusion of some agreement which should provide for scientific protection of the joint resource.

Another part of the Commission's work had been the recommendation of a convention to protect the halibut reserves exploited jointly by Canada and the United States. These were likewise suffering from overintensification of fishing. This also was not adopted at the time, but an international treaty for the protection of this fishery finally became operative in 1924. (See Chapter XIII.) The establishment of a halibut commission and its conspicuous success can be regarded as the main propulsive power in securing the final adoption of a salmon treaty 13 years later. Conservation work in any branch of the fisheries forms part of an organic movement. Success in one fishery paves the way for similar procedure in another.

In 1929 a convention for protecting the Fraser River-Puget Sound sockeye was signed by the President of the United States and transmitted to the Senate for action. It was not ratified, however, by the Senate until May 1936, and then with three reservations which necessitated reconsideration on the part of the Canadian government which had already ratified the convention in its original form. At last the efforts of proponents of conservation in Washington and British Columbia were crowned with success when the treaty became effective in the summer of 1937.

The convention¹⁷ is to continue in force for 16 years, and thereafter until one year from such date as either party shall give notice of a desire to terminate it. It provides for the appointment of a commission consisting of three Americans and three Canadians to investigate the sockeye and ultimately after eight years'

¹⁶ U. S. Dept. of State, *Report of American Canadian Fisheries Conference, 1918* (Washington, 1920).

¹⁷ *Sockeye Salmon Fisheries. Convention between the United States of America and Canada*, U. S. Treaty Series, no. 918.

investigation to promulgate regulations looking to their preservation. This eight-year delay before any action can be taken was one of the reservations introduced by the United States Senate. Although effective regulation must be based on scientific research, much of which needs to be done, the long period of waiting before effective action can be taken is considered a mistake by some informed observers who believe that already enough is known to make at least a beginning at useful regulation.

Under its regulatory power the Commission will have the right to limit or prohibit the taking of sockeye in convention waters between June 1 and August 20 in any year. When fishing is permitted, however, inhabitants of Washington shall have the right to operate any gear legal in that state and similar privilege is granted the inhabitants of British Columbia. The Commission's powers to control types of gear used is further curtailed by the provision that it cannot authorize any gear not permitted by Washington or British Columbia. It has the power to improve spawning grounds, to carry on fish-culture work, and to observe and recommend improvements in the conditions of the streams.

In carrying out its duties, the Commission is to have the benefit of an Advisory Committee composed of five Americans and five Canadians, and expenses of the work are to be borne jointly by the two countries. The work of the Commission has already begun, with the scientific investigation temporarily under the direction of Dr. W. F. Thompson, who has so ably conducted the work on the halibut fishery.

The necessity for rehabilitation of the sockeye can be easily seen from Fig. 10 where the decline of this once great fish supply is evident. The wiping out of the big run in 1913 has been already described. Even before this time, however, the effects of over-fishing were evident in the three-year period between the big runs. Since 1930 another big run seems to have been established, although 1938 figures did not come up to the two former years. It is thought, however, that regulations were more stringent on both sides of the boundary line and that the escapement was good. Fig. 10 also shows the preponderance of the Canadians in the catch before 1905 and the greater share which has gone to the Americans since that time. The removal of traps from the state of Washington in 1934, however, restored the advantage north of

the boundary line. Under the new treaty the regulation of the fishery is to be administered in such a way as will enable as nearly as possible the equal partitioning of the catch between the fishermen of the two countries.

As the new Commission can take no regulatory action until 1945, a considerable time must elapse before the effects of its work

can be judged. Meanwhile it can be only hoped that regulations in Washington and British Columbia will be such as to prevent further decline of this valuable salmon pre-

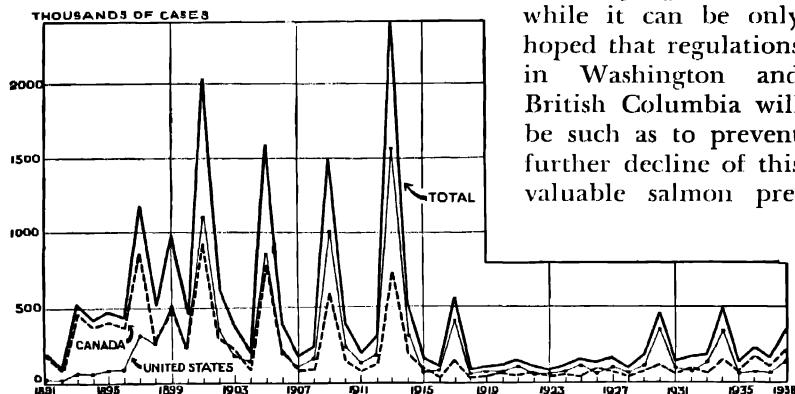


Fig. 10. Sockeye Salmon Pack of Puget Sound-Fraser River, 1891-1938.

Source: John N. Cobb, *Pacific Salmon Fisheries*, U. S. Dept. of Commerce, Bureau of Fisheries, Fisheries Document no. 1092 (Washington, 1930), p. 515 for data through 1927; data for succeeding years from *Pacific Fisherman*, 1939 Yearbook, pp. 69, 83.

serve. The importance of success in this conservation effort is heightened by the fact that the natural conditions of the Fraser watershed are such as to limit human habitation and hence protect the natural environment in which the salmon spawn and spend the early period of their life. It is very nearly ideal as a salmon region in sharp contrast to the Columbia River, for example. A happy augury for the ultimate rehabilitation of this sockeye run is the success already attained in bringing back the even further depleted halibut fishery by means of similar international control.

COST OF CONSERVATION

One aspect of salmon conservation not hitherto mentioned is the cost of carrying out all the regulatory and fish-culture measures. The following table published by the *Pacific Fisherman* in

1937 gives the approximate total expenditures during the decade 1927-36 for propagation, conservation, regulation, protection and study of salmon in the regions thus far considered.¹⁸

U. S. Bureau of Fisheries in Alaska, 10 years, 1927-36, for propagation, patrol, research, etc.	\$ 3,576,000
U. S. Bureau of Fisheries, salmon propagation in California, Oregon and Washington, 10 years, 1925-35.	827,000
Territory of Alaska for propagating salmon, cleaning salmon streams, destroying salmon enemies, etc., 1925-35.	362,000
Territory of Alaska, rebate on taxes account of salmon fry release by private hatcheries, 10 years, 1925-35.	90,000
State of Washington, salmon hatcheries, protection, etc., 1926-35. (Salmon eggs handled, 1,420,085,000)	1,966,000
State of Oregon, salmon propagation, protection, etc., 1927-36.	1,297,000
State of California expenditure for salmon propagation, patrol, research, etc., 1927-36.	635,000
Province of British Columbia, hatcheries, conservation, patrol, research, etc., 1927-36.	177,000
Bristol Bay (Alaska) packers' contribution for destruction of salmon enemies in that area, 1927-36.	135,000
Alaska predatory fish bounties, fish ladders, stream improvements, etc. (W.P.A. funds), 1935-36.	45,000
Dominion of Canada funds spent in British Columbia waters, mostly for conservation, protection and regulation of salmon fisheries, 1927-36.	4,575,000
Dominion of Canada for salmon propagation in British Columbia, 1927-36.	871,000
International Fisheries Commission expenditures for conservation, regulation and research on halibut, 1927-36.	554,270
Biological Board of Canada, experiment and biological stations in British Columbia, 1927-36.	991,000
Total.	\$16,101,270

Thus throughout the salmon fisheries of the Pacific Northwest and Alaska there is spread a net of conservation regulations, Federal, Dominion, state, interstate and international, which have been working to preserve the salmon supply and on which millions of dollars have been expended. The effort has been unsuccessful in California, and, so far, of questionable success in Washington and Oregon, although it has probably prevented even greater decline. Alaska, however, seems to enjoy conservation policies and techniques which should make its salmon reserves part of the heritage of succeeding generations. Rehabilitation of the United States-Canadian sockeye run is waiting on further scientific investigation and the coming into force of the regulatory powers of the new Commission. Success of the Sockeye Commission in its

¹⁸ *Pacific Fisherman*, Feb. 1937, p. 19.

task of rehabilitation and the establishment of similar conservation measures on the Columbia might well go far towards recouping the losses in the Washington and Oregon runs. The halibut commission has proved what can be done in bringing back a depleted fishery and has thus advanced the acceptance of conservation policies.

As already indicated, however, an international problem has now arisen in the north Pacific which carries a new potential threat to salmon conservation. This is the possibility of the exploitation of the salmon runs of this continent, and particularly of Alaska, by Japanese and other foreign fishing fleets engaged in offshore operations. In view of the importance of this issue, and its large implications, its consideration has been reserved for a later chapter.

ECONOMIC FACTORS IN THE SUPPLY OF SALMON

IN THE foregoing chapters, after a brief conspectus of the salmon industry as a whole and especially of its technology we turned at once to the basic problem of the industry: the supply of fish, as drawn down by intensive fishing efforts and built up by protective governmental regulation. Upon the preservation of this supply by social control depends the survival of the salmon industry as a source of food and as an opportunity for jobs and business profits. In this sense all other phases of the industry may be said to be subsidiary.

To explain the volume, price, and quality of salmon products reaching the consumer, or the ebb and flow of profits in the industry, or its importance as a source of livelihood for wage-earners, will require a further exploration of the structure and functioning of the industry at successive stages of production and distribution. As the next step in this analysis we shall proceed with our examination of supply factors—i.e., conditions which influence the volume and price of the product reaching the consumer. In pursuing this inquiry one finds that the industry divides itself naturally into three stages, or levels—fishing, canning and marketing. Having already characterized the physical setting of the fisheries and the basic conservation problem, we shall now take up these stages in Chapters V to VIII.

The Question of Monopoly

One question runs rather insistently through these chapters; yet, because of its intricacy it receives only a partial answer. This question concerns the role of competitive and monopolistic elements in the industry. Here as elsewhere in modern economic life the pattern of industrial control is complex and shifting, and much is yet to be learned concerning the best ways of conserving the interest of the public in industrial efficiency and stability from a social viewpoint. Strong monopolistic tendencies are sometimes

alleged to exist in the salmon industry. It is asserted that the business is in the hands of a few large packers whose power enables them to exclude potential rivals, to limit supply collectively, and to wield a substantial, unified control over price. It is sometimes assumed, moreover, that such monopoly power as exists is exercised to the detriment of the public interest.

There are two questions here which are not identical. One is the degree of competition and monopoly actually prevailing; and the other the desirable or undesirable consequences from the public point of view. The problem of monopoly in modern industry is enormously complicated by the almost infinite variety and degree of monopolistic practice found today. Among students of the subject the old, simple dichotomy of "pure competition" and "monopoly"—never more than a theoretical device—has long since been overlaid by more realistic expositions of "monopolistic competition" in its manifold aspects. Virtually every industry reveals some balance of competitive and monopolistic elements, and the north Pacific fishery industries are no exception. In the salmon industry, for example, elements of monopoly are to be found in the possession of favored trap sites, in preferred access to credit facilities, in the exercise of "price leadership," in the creation of specialized markets through the advertising of branded products, etc. On the other hand, it is equally clear that the industry is strongly competitive in many aspects, not only by virtue of the presence of numerous small operators but also with reference to relations among larger concerns as well.

While we shall devote attention to considerations of this type, our broad objective is to present a general exposition of those influences which condition the supply, pricing and quality of salmon products. It is beyond the confines of this study to attempt an exhaustive measurement of competitive and monopolistic elements, of their particular historical, geographical, technical and personal determinants, or of their precise effects upon the market.

Still more difficult is a realistic appraisal of such facts in terms of public interest and public policy. It is impossible to conclude *a priori* whether a change in the scale of industrial organization is in the public interest or against it. Neither big nor small business is inherently good or bad; the question is to be judged only with reference to a particular case and in terms of results for the

consumer, the worker and the investor. The crossroads store-keeper may enjoy a more monopolistic position in his local market than the large salmon packer broker in his world market. The small textile factory may provide less satisfactory working conditions than the huge automobile plant. The growth of big business units and the coordination of marketing policies may help to remove planless maladjustment of capacity and year-to-year production to the market, which contributes so greatly to the instability of modern economic life. On the other hand, where the large business unit achieves success, it is not to be assumed too readily that this connotes efficiency in any sense other than business profits. As A. A. Berle, Jr. has observed,¹ efficiency may mean merely that a firm has beaten down its wages and raw material prices at the expense of workers and primary producers, or that it is more than usually successful, through advertising, in charging consumers an extra premium for its product, or that it has succeeded in unloading on the community the costs of unemployment relief, the disposal of waste, and other burdens which rightly are chargeable to its own operations.

The present study falls short of any complete evaluation of the salmon industry in these respects, as the authors frankly admit. It does not go beyond a broad description of the structure and functioning of the industry. Conclusions about the working out of competitive and monopolistic elements are offered merely as hypotheses suggested by the facts of the structure of the industry and its practices—that is, the *conditions* of the market—rather than as definitive statements based upon an intensive study of the *results* of market forces in terms of investment, output, costs, prices and profits at the several stages of the industry.

As noted above, the salmon industry divides itself naturally into three stages—fishing, canning and marketing. Chapter V continues with the actual fishing process itself, already dealt with to some extent in Chapters II to IV.

FISHING OPERATIONS

It is apparent even to the casual observer that certain special conditions prevail in salmon fishing which are absent from most

¹ "Investigation of Business Organization and Practices," *Plan Age*, Sept. 1938, pp. 185-208.

other industries, even other extractive industries, today. These conditions center around the extent of the fish resource and the factors affecting it, and the organization and character of fishing operations.

First and most noteworthy is the fact that the resource of fish is naturally limited in quantity in any one season. This is a simple, biological fact. Its characteristics and implications have already been examined in the foregoing chapters, but it needs to be mentioned again as the starting point for any analysis of the structure of the north Pacific fishing industries. Not only are the fish resources of this region limited, but the region itself is by far the most important salmon fishing ground in the world. Accordingly natural scarcity of the raw material is a characteristic of the salmon industry influencing the volume and price of the product which it offers the consumer.

Secondly, this natural scarcity is reinforced in any particular season by an elaborate code of governmental regulations in the interest of conservation. These regulations, as detailed in Chapters III and IV, serve in various ways to limit the scope of fishing operations in terms of geographical area, season and types of gear. In the long run, of course, they increase rather than diminish the size of fish runs if they ensure the proper escapement, but at any particular time they limit supply. In so doing they not only promote conservation but facilitate the orderly utilization of the catch, influence costs of production, and serve as a price support in the market.

These two factors, then, together tend to keep up the value of salmon relative to other food products through making for a certain scarcity in any particular season. At the same time, as we have noted, it is conservation practices primarily which preserve the natural resource from extinction. Moreover, neither factor itself creates a condition of monopoly; neither precludes the presence of many competing forces in the industry. Indeed, conservation regulations have probably served in the past to reinforce competition on balance, because they have been based upon the continued utilization of various techniques of fishing, including the use of mobile gear as well as traps. This needs to be qualified in at least one respect, however, for the wider spacing of traps in the interest of conservation tends to favor the larger concern in Alaska, as explained later.

The Open Character of Fishing Operations

Thirdly, it should be noted that while the broad geographical area within which salmon are caught is limited in scope—and the north Pacific as a region is supreme—the fish may nevertheless be caught in many places along a coastline of tremendous extent. Alaska alone has a total shore line of over 32,000 miles. Indeed, salmon can only be secured in extensive quantities over a wide area. Nor must the fishing even take place directly on the shore or up the rivers. As the Japanese have recently demonstrated—to the alarm of American interests—technological improvements have made it possible to catch and can salmon successfully on the high seas some distance from shore. We may also note, parenthetically, that not only are fishing efforts necessarily widely dispersed, and increasingly so as the industry has grown, but the processing itself must also take place in the locality where the fish are caught, owing to the perishability of the fish and the slowness of water transport.

Related to this natural geographical dispersion, in the fourth place, is the legal circumstance that no individual property rights can be acquired over the salmon reserve itself. Important competitive advantages in fishing cannot be gained by the mere acquisition of property rights in land along the shore or up the rivers. They would be secured, it is true, from the ownership of good fish trap sites, which are of vital importance in many areas. Traps account for half the total Alaska catch. In Washington, however, they have been abolished by law; in British Columbia they are little used; and in Bristol Bay they are forbidden by regulation. Where traps are employed in Alaska the sites are licensed by the Territorial Government to applicants who hold Federal permits and who must make application annually and occupy the site continuously (although continuity in the granting of licenses is the general practice). They are always subject to certain restrictions. Thus, even where traps enjoy certain important advantages over other fishing devices, it is apparent that the foundation of property rights and privileges upon which fishing is conducted in Alaska differs notably from that of, say, mining or agriculture.²

These third and fourth factors—the geographical dispersion of

² For other references to the use of traps, see pp. 21-23, 51-53, 63-64, 87-88, 99, 107, 116-17, 123.

fishing operations and their "open" character—are obstacles to the building up of monopolistic control in salmon fishing. They make it impossible to limit entrance into the industry merely by cornering the locations favorable to fishing operations, even though there do exist important differences in the advantages of various trap sites. True enough, geographical dispersion tends to work against the small operator in certain respects, for in covering a wide area the large concern derives advantages from unified transport arrangements and the coordination of scattered properties. The spacing of traps in Alaska has tended to favor the large concern.³ Nevertheless, the above factors taken together are a hindrance to the concentration of industrial control at the extractive level of the industry.

This influence in favor of competition is reinforced by a fifth element: the relatively simple and noncapitalistic character of fishing operations themselves, as described in Chapter II. They require boats, fishing gear (traps, gill nets, seines, fish wheels, or hook and line) and a good deal of hand labor. They are essentially small scale, save when long-distance operations require a good deal of capital for large fishing vessels and supplies. There have been certain improvements in fishing techniques in recent decades, it is true, and some of them have tended to increase the scale of organization in the industry. Nets are larger, and fixed and floating fish traps have come into wide use. The outstanding change has occurred in transportation methods, made possible through the introduction of the gas engine and later the more efficient Diesel engine. Bigger and more powerful fishing craft and cannery tenders have permitted the carrying of larger crews, the use of larger gear over wider fishing areas, and the hauling of heavier cargoes with greater rapidity from the fishing grounds to the canneries and to fresh fish markets. Longer fishing seasons have been made possible; labor saving devices have been introduced; and improved working conditions secured for the fishermen and crews. Here again, therefore, we must qualify our generalization by noting that fishing operations have become somewhat more capitalistic, and consequently less open to the "small fellow" without financial resources to make the initial investment.

³ For a discussion of the competitive position of the small firm, see Chapters VI and VII.

or meet the heavy risks.⁴ It remains true, nevertheless, that fishing techniques and the physical environment in which they are applied still do not in themselves afford favorable conditions for the concentration of fishing effort in the hands of a single firm or combination of firms.

The Advantages of Size

A contrary influence has already been suggested, however, in a sixth characteristic of salmon fishing today: the fact that many fishing grounds are so located as to be poorly served by regular transportation lines and remote from population centers providing suitable living conditions and occupational opportunities for fishermen in the off-season. The result is that the control of fishing operations, in western Alaska especially, tends to center in the hands of large companies able to provide seasonal transport for men, gear and supplies to and from the fishing grounds, housing arrangements, and various services normally supplied by public utilities or government. Where fishing is the chief occupation, as in Bristol Bay, frontier conditions tend to bring not the migration of small enterprises characteristic of the traditional American frontier but rather the annual influx of thousands of hired workers, transported, provisioned and equipped for a season's work in return for a season's wage. The small, independent fisherman is to be found chiefly in central and southeast Alaska, Puget Sound and the Columbia River.

This tendency to large-scale enterprise arising from the factor of remoteness is powerfully reinforced by the fact that historically, and for very practical reasons, fishing and canning have been closely linked together, with the canning companies tending to dominate fishing activity. Accordingly, the number of independent firms engaged in fishing operations is determined not only by the characteristics of fishing operations, to which we have alluded above, but also by the degree of combination in subsequent stages of the industry—canning and marketing operations.

The reasons why the canneries tend to control directly the bulk

⁴ The replacement value of the average modern five- to seven-man purse-seine boat with net ranges from \$8,000 to \$25,000. Pile-driven traps in place cost from \$7,500 to \$40,000, while floating traps are generally somewhat cheaper.

of salmon fishing are clear. Because fresh fish must be processed immediately and because of the slowness of water transportation facilities canneries must be located at or near the place where the fish are caught. Canning is almost as widely dispersed geographically as fishing. Moreover, the cannery operator requires a regular and adequate supply of the raw product, standardized as to quality. These circumstances, together with the remoteness of fishing grounds from population centers and the consequent need for organizing and financing fishing activity on a fairly large scale, have tended to place fishing operations in the hands of the packers with their more ample financial resources. Accordingly, in order to judge the extent of competition at the fishing level, we are forced to examine the balance of competition and monopoly at the processing level as well.

Competitive conditions in the canning industry will be considered in some detail in subsequent chapters. At this point it need only be noted that there are a number of firms in the industry and that their competitive position varies with their importance in particular fishing areas and in particular lines of output. In 1937 there were 177 canneries operating in the north Pacific area, of which 113 were in Alaska. Many concerns own several canneries, however, and the total number of separate companies was 111, of which 75 operated in Alaska.⁵ As much as 58 per cent of the American pack was accounted for by the 9 largest operators. In addition, however, there were numerous small operators, and it should also be observed that the largest company accounted for only 13.5 per cent of the total United States pack (including Alaska) in 1937.⁶

Without pursuing the matter further at this point, it may be observed that the growth of large-scale operators in the canning field is in some degree a growth in the scale of fishing activities as well, since the two cannot be dissociated. This remains true even though, as previously observed, fishing itself can be carried on by relatively small-scale, nonmechanized operations and continues to be engaged in successfully by many independent trap owners and purse seiners.

⁵ See p. 18. See also p. 104 *et seq.* for a description of the structure of the canning industry.

⁶ *Pacific Fisherman*, 1938 Yearbook Number, pp. 59-67.

Competition of Types of Gear

Distinct from the competition of individual operators, and yet related to it, is the competition of different types of gear. If the only type of gear permitted were the trap, for example, and if trap licenses or permits should be awarded exclusively to a single combine, a substantial monopoly in fishing would exist. This statement is purely hypothetical, however, and actually is quite contrary to fact.⁷ The truth is that there exist large amounts of available mobile gear capable of furnishing competition in fishing and thus standing in the way of a gear monopoly. Purse seines, gill nets and other specialized types of mobile gear can be used in waters where traps are ineffective, and commonly are used in balanced combination with traps. Moreover, conservation policies have usually been based on the customary fishing techniques and conditions of the Northwest. They have tended to encourage the use of various indigenous types of fishing gear rather than to foster concentration on any particular type.

The threat of a gear monopoly is remote in Alaska, as shown by Table 3, giving the relative importance of different types of gear. In 1937, of all the fish caught in Alaska 46.4 per cent was caught by trap, 27.7 per cent by seines, 24.3 per cent by gill nets, 1.4 per cent by lines and .3 per cent by wheels. Traps predominate in southeastern Alaska, although seines also are important; while gill nets account for almost the entire catch of western Alaska. There appears to have been little change in the relative importance of traps in the past decade, the proportion of trap-caught fish tending to vary between 45 per cent and 60 per cent.

Table 3. *Distribution of the Salmon Catch of Alaska by Types of Gear, 1922-37*

Gear Type	Southeastern Alaska				Central Alaska				Western Alaska			
	1922	1927	1932	1937	1922	1927	1932	1937	1922	1927	1932	1937
Seines.....	36	16	20	29	28	29	15	39	6	4	5	4
Gill Nets.....	2	6	2	3	7	8	10	8	90	92	90	95
Traps.....	60	70	74	65	65	63	75	53	3	1	—	—
Lines.....	2	8	4	3	—	—	—	—	—	—	—	—
Wheels.....	—	—	—	—	—	—	—	—	1	3	5	1

Source: Ward T. Bower, *Alaska Fishery and Fur Seal Industries* (annual), 1922-37, U. S. Dept. of Commerce, Bureau of Fisheries (Washington).

⁷ For a description of the method by which trap sites are obtained, see pp. 52-53. For further discussion of traps see also pp. 21-23, 63-64, 83, 99, 107, 116-17, 123.

In the districts relatively close to home waters (southeast and central Alaska and Puget Sound) the importance of purse-seine operations is noteworthy. In 1937 purse seiners accounted for 29 per cent of the salmon caught in southeastern Alaska and 39 per cent in central Alaska. Traps predominated, however, in both areas, despite regulations regarding spacing, etc. In the former approximately 51 per cent of the traps were controlled or leased by the 9 leading producers, whereas in the latter these leading producers controlled 41 per cent of all traps. The productivity of these traps is not revealed to the public.

In the more remote areas, principally western Alaska, the preponderant gear type is the gill net, used by "company" fishermen who are paid on a piece basis. In Bristol Bay traps have been abolished and purse seines are likewise forbidden by government regulation. Purse seiners account for only 2 to 10 per cent of the annual catch in western Alaska. How many of these boat operators are independent is not known, but a sizable fleet fishes for the floating canneries that operate in the district. As already noted, the purse-seine boat in all waters of Alaska is limited in size by law—a factor that tends in part to reserve this branch of the fishing industry for smaller boats.

Even the preponderance of one type of gear in a particular area would not be monopolistic in its implication unless the area accounted for the bulk of the total salmon catch, and unless the gear in use were under unified control. Such a condition is far from realization. The abolition of fish traps by law in the state of Washington (see p. 63) now leaves production in the hands of mobile gear users, especially purse seiners in that district. However, while affording these fishermen protection from a certain type of local competition, it does not necessarily lead to any combination among them nor indeed does it shield them from the competition of the larger supply of salmon from Alaska and other areas. Any such combination among gear users would be extraordinarily difficult to effectuate, so far as fishing operations themselves are concerned, and would be subject to the same weakness as any loosely organized association of this type. Gear competition is inherent in the natural setting of the industry, and has been protected rather than threatened by regulatory policies to date.

VI

COMBINATIONS IN THE SALMON INDUSTRY

IN ANALYZING the characteristics of fishing operations themselves we have been forced already to give some attention to the organization of the salmon industry at its intermediate stage—the processing level. This integration of industrial processes does not stop with the operations of fishing and canning, however. It extends likewise into the field of marketing as well. Accordingly, in proceeding to discuss the business of salmon canning we shall discover that considerations of the market tend to influence the organization and operations of canneries, just as the necessities of canning affect the organization of fishing operations. So far as possible we shall postpone our analysis of marketing and distribution until after the manufacturing organization itself has been considered.

In order to provide an historical background against which to analyze the production process it seems best first to present the story of combinations in the salmon industry, influenced as they have been by the search for profits and security. Having pictured the evolution of vertical and horizontal combinations, it will then be appropriate to analyze the factors in production and marketing which have molded the industry in its present form.

CAUSES OF EARLY COMBINATIONS

The formation of the early combinations in the salmon canning industry closely paralleled the trust movement in the United States. It occurred at the same time and bore resemblances to the general trend toward combination which appeared where conditions of overexpanded plant, uncontrolled supply and falling prices prevailed. The early consolidation movement undoubtedly was accentuated by the periodic depressions of the 'eighties and 'nineties which tended to eliminate the weaker companies and to force the survivors into protective associations.

As a group the early packers were far from successful in the

making of profits or even in maintaining solvency. From 1878 to the beginning of the World War the number of failures of canneries and salteries was extraordinary. The history of this period of 36 years is replete with stories of bankruptcies of companies, destruction of plants, frequent abandonment of canneries and removal to new locations. Many sales of going concerns and plants were recorded.¹

The greater number of canneries prior to 1893 was owned by single proprietors or partnerships. Plants were small and frequently managed directly by the owners. Except for the more elaborate ones they could readily be moved from one site to another to adjust to changing fishing conditions and competition. They were devoid of much machinery; their costs were low, and most of the early packing and handling prior to 1903 was done by hand. The first processing was that of salting salmon (and occasionally other less important fish) for the mild-cure market in the United States and Europe. Often the canneries were enlargements of salteries that preceded them in point of time.

With the coming of more adequate water transportation and rail facilities from the Pacific coast ports to eastern markets in the 1890's the production of canned salmon began on a large scale. The introduction of the fish trap, the perfecting of the processes of preserving fish by heat in tin containers, the many improved technical devices such as the "Iron Chink"² (1903), automatic filler and soldering machines, and the Jensen can-making machine soon gave the young industry new scope for mass production.

The exploitation of enormous virgin fish runs furnished a supply of raw material in many cases beyond the capacity of plants in early years. Costs declined steadily, as output in individual plants increased from a few hundred cases per day to 3,000 and 4,000 as early as 1900. Competition was often of the severest type, having as its mainspring the desire for maximum cannery packs and the elimination of rival concerns whose product was flooding the markets. Company fights for dominance over trap sites and even over entire fishing areas were commonplace. They were carried on by rank-and-file workers and extended even to independent fishermen

¹ Cobb, *Pacific Salmon Fisheries*, cited, pp. 422-76.

² A machine which was the forerunner of the "Iron Chink" was in operation in the Alitak cannery in Alaska in 1900. These devices eliminated much of the piece hand work which was the "bottle neck" in the cannery industry.

who were selling their fish to rival concerns.³ Exploitation to the point of elimination of important runs often resulted.

Larger and still larger quantities of canned products were thrown on the market. "Ledger costs of production were practically an unknown thing," states one of the early operators.⁴ Frequently there appeared distress selling on the part of weaker concerns possessed of insufficient capital to carry supplies through the selling season. Price cutting was carried on in the primary markets which later spread over wide wholesale and retail areas of the United States and into foreign countries. General demoralization often resulted.

The shores of Alaska, British Columbia, Washington and Oregon soon were strewn with the wreckage of concerns that rushed into the little understood operations of fishing, packing and marketing canned salmon. Navigation by sailing vessels was perilous and costly; fishing grounds and trap sites were proven only after much trial and error; methods unique to the territory were learned only after years of experimentation. No other fishery in the world in the 1890's, it was said, equalled the salmon fishery for scope of techniques.

The mortality of companies and the abandonment of plants were high in the period 1880-1920. In southeastern Alaska, out of a total of approximately 126 plants reported built, 29 were subsequently dismantled or destroyed, many by fire, and 33 were sold.⁵ Of the companies operating in this territory 11 passed through bankruptcy, while 6 combinations or mergers were perfected, only to pass eventually out of existence. How many concerns became insolvent in addition to those reported will probably never be completely known.

In central Alaska, of the 55 reported canneries constructed before 1920, 23 were dismantled or destroyed, 13 were sold, and 3

³ Some of the charges made by the smaller concerns against the larger companies were: (a) price cutting of salted and canned products aimed at the ruining of small operators; (b) refusing passage on company boats; (c) charging exorbitant freight and passenger rates; and (d) interference with fishing operations. *Salmon Fisheries of Alaska, 1892-1905*, Reports of Special Agents, cited, vol. 2, pp. 432-35.

⁴ Interview with one of the large packers who has operated in Alaska since 1895.

⁵ These statistics, and those which follow, were derived by actual count of canneries built, abandoned and sold in each district for the years 1880-1920, as shown in reports of Cobb, cited, pp. 422-76. The active contact maintained by this authority with the industry and his access to original field reports of the United States Bureau of Fisheries covering this period make these data reliable to an unusual degree.

concerns went bankrupt, while 2 combinations were reported. The British Columbia salmon fishery industry suffered from the same disabilities. Out of about 132 canneries constructed before 1920, 64 were sold, dismantled or destroyed. Several associations and combinations were formed.

The industry in the state of Washington fared but little better. The exact number of plants built before the close of the World War is uncertain, but Cobb reports that by 1915 there were 41 in operation on Puget Sound. Some 65 to 70 were mentioned as being built. Thirty-eight were destroyed and 8 sold, while 5 companies went bankrupt. The Columbia River territory showed better success on the part of operating companies, but the Oregon coastal district followed the general trend: out of approximately 30 canneries built, 16 were destroyed or abandoned during this period.

The World War years, it may be noted, brought an inflationary overexpansion of the industry. Salmon prices rose precipitately in conjunction with other food prices, and in order to stimulate output the government relaxed its restrictions on the catch. The result was as might be expected. The number of Alaska canneries rose rapidly, from 81 in 1914 to 135 in 1918; high prices and profits led to overcapitalization; and the post-war depression brought the inevitable collapse.

COMBINATIONS IN THE SALMON INDUSTRY (1880-1920)

Enough has been said of this early period to indicate its chaotic character. The lure of sporadic high profits, not uncommon during the early years, attracted many operators to the industry. If, on the one hand, the pack expanded steadily as new fish runs were tapped and new techniques introduced, on the other hand there was bitter competition leading to periodic overexpansion. Each demoralization of the market was followed by a new crop of bankruptcies. It was a new industry in a new country. Progress was rapid but it was disorderly, and especially for those who were trying to make a profit or discover some assurance for the future. Consequently we soon find here the movement toward consolidation and combination which set in generally in American industry during the latter years of the nineteenth century.

Soon after the first overexpansion in 1888-89, which resulted in serious price declines and near bankruptcy to many of the pro-

ducers, a movement was started in Alaska to unify control over the production and marketing of canned salmon. In the states the trend toward consolidation could be observed somewhat earlier. The first move in Alaska consisted simply of cooperative working agreements between a limited number of individual cannery owners. In 1890 three concerns owning single plants in the Chignik district joined in the plan. In 1891 the movement spread to other districts and soon included practically all of the operators in central Alaska. Marketing pools were formed, quotas were assigned to individual plants and many canneries were closed in order to save expenses and restrict the mounting output which was demoralizing primary markets.⁶

As an outgrowth of the early movement the Alaska Packing Association was formed in 1892. It was essentially a profit-sharing organization and included 31 canneries, of which 9 continued to operate while the others were closed.⁷ The cannery owners were given shares in the pool in proportion to their respective packs in the previous year. It was reported that output was reduced by one half. In all of Alaska only 15 canneries were operated in that depressed year, whereas in 1889 there had been 37.

In 1893 the association was incorporated as the Alaska Packers Association and the plants of the constituent members, valued at \$1,033,850, were exchanged for its capital stock. Additional shares were sold to the members but no public offering of securities was made.⁸ This first important consolidation led by dominant San Francisco interests represented a merger of 90 per cent of all operating plants in Alaska. Their combined pack equalled 72 per cent of the territorial output of 653,654 cases. The Alaska Packers Association proved to be a financial success from the date of its formation. During the years 1893 to 1899 the yearly average net profit was \$509.26 per thousand cases packed; in the decade 1900-09 the yearly average was \$954.46; and from 1910 to 1919 it was \$1,216.29. By 1903 it had increased its total number of plants to 23, the maximum number operated in its long history which extends down to date. One of these plants was located on Puget

⁶ See Jefferson F. Moser, *The Salmon and the Salmon Fisheries of Alaska*, U. S. Fish Commission, vol. 18 (Washington, 1899), pp. 18-21; quoted in Cobb, cited, p. 455.

⁷ *Ibid.*

⁸ U. S. Fish Commission, *Salmon Fisheries of Alaska, 1893* (Washington, 1894), p. 420.

Sound, where the Association long held a dominant position through the ownership of a group of plants whose combined output was the greatest in the earlier years of any company in the district. Many additional canneries secured by the Association were closed during the pre-war period.

The form of organization adopted by the Alaska Packers Association in 1893 has been the one subsequently followed by virtually all the combinations in the salmon packing industry. Neither this organization nor the ones later to be described were loose aggregations of independent firms, as suggested by the titles, but were real mergers in which plants and equipment were consolidated and operated under unified control. Table 4 gives some indication of their relative importance in their respective areas in terms of output.

With the upswing of general business in the late 'nineties and early 1900's the Alaska pack increased rapidly and by 1902 it was five times that of 1892, while the number of canneries increased from 15 to 64 during this period of expansion.⁹ In 1901 the second important merger took place. In that year the Pacific Packing and Navigation Company, financed largely in eastern centers, was formed to operate along the lines of the Alaska Packers Association. It acquired some 23 plants, 6 of them from the Pacific Steam Whaling Company and the balance from concerns operating in Alaska and Puget Sound.¹⁰ These properties were secured through the issuance of common stock, preferred stock and debentures in the total amount of \$16,000,000. This firm, together with the Alaska Packers Association, controlled over one half of all plants in Alaska and Puget Sound. No mention is made in the literature of the time of any attempt to restrict production or to control the marketing of salmon.

This new merger proved to be a complete failure. With heavy losses to its owners and creditors its assets were taken over in 1904 by the Northwestern Fisheries Company, a subsidiary corporation of the Booth Fisheries Company, nationally known packers and dealers in fish products. Numerous acquisitions of plants were also made by the well-known packing firms of Libby, McNeill & Libby

⁹ In addition to the 64 plants in Alaska in 1902, there were 14 on the Columbia River, 21 on Puget Sound, and a few scattered along the coast of Washington and Oregon, while 69 were operated in British Columbia. Cobb, cited, pp. 556-79.

¹⁰ *Ibid.*, p. 445.

and Pacific American Fisheries, Inc., during this time. These two firms, together with the Alaska Packers Association and the Alaska Pacific Salmon Company, are today the largest in the field.

In the years prior to and during the World War other consolidations of companies operating in Alaska accompanied the growth of the industry, while the Alaska Packers Association which had originally dominated the field declined in relative importance. On the whole these combinations met with indifferent success.

In the Columbia River district, where the industry was older and more established, the merger process set in even earlier. The Columbia River Packers Association, still the dominant concern in this region today, was formed in 1887. The outgrowth of a former unsuccessful merger, it combined the canneries of nine independent firms.¹¹ A similar merger was arranged in the British Columbia region, where the early years had likewise brought a rapid multiplication of plants. The British Columbia Packers Association, formed in 1901, embraced 29 out of 48 plants on the Fraser River and 12 of those situated in the waters of northern British Columbia.¹²

Success of Early Combinations

Up to 1920 three combinations were outstanding: the Alaska Packers Association, which operated in Alaska and Puget Sound; the Columbia River Packers Association, which operated in Alaska and the Columbia River; and the British Columbia Packers Association, which operated exclusively in British Columbia. Their position is shown in Table 4.

In the early years both the Columbia River and British Columbia firms held substantial positions in their respective territories, each packing over 30 per cent of the production. In 1914 British Columbia Packers accounted for 25 per cent of the British Columbia pack,¹³ but it lost ground in the following decade. Neither in 1919 nor in 1925 did it dominate its district, for it accounted for only one sixth of the total cannery output. By 1930 it had regained a pre-eminent position, again packing over 45 per cent, but this had receded again by 1934, the latest year for which data are avail-

¹¹ *Ibid.*, p. 433.

¹² Its name was changed in 1914 to the "British Columbia Fishing and Packing Company, Ltd.," *Ibid.*, p. 472, and later to the "British Columbia Packers, Ltd."

¹³ *Pacific Fisherman*, Yearbook, 1915, p. 75.

NORTH PACIFIC FISHERIES

Table 4. Position of Three Leading Salmon Packers in Their Respective Districts

(Packs in thousands of cases)

Ratio of Alaska Salmon Packed by the Alaska Packers Association

Period (annual average)	Pack			Association Pack as Per Cent of Total
	Alaska Packers Association	Other Companies	Total	
1893 ¹	462.6	181.2	643.8	72.0
1893-99 ²	673.9	165.1	839.0	80.2
1900-09 ³	1,187.3	980.7	2,168.0	54.8
1910-19 ⁴	1,131.2	3,247.8	4,379.0	25.8
1920-29 ⁴	673.5	4,121.5	4,795.0	14.0
1930-37 ⁴	701.9	5,370.1	6,072.0	11.5

Ratio of British Columbia Salmon Packed by the British Columbia Packers Association⁴

Year	Pack			Association Pack as Per Cent of Total
	British Columbia Packers	Other Companies	Total	
1904.....	164.7	301.2	465.9	35.5
1909.....	292.6	675.3	967.9	30.2
1914.....	280.4	830.6	1,111.0	25.2
1919.....	233.2	1,159.9	1,393.2	16.7
1925.....	286.5	1,410.7	1,697.3	16.9
1930.....	1,039.0	1,182.8	2,221.8	46.7
1934 ⁵	494.4	1,088.4	1,582.8	31.2

Ratio of Columbia River Salmon Packed by the Columbia River Packers Association⁴

Year	Pack			Association Pack as Per Cent of Total
	Columbia River Packers Assn.	Other Companies	Total	
1902.....	131.5	216.0	348.1	38.0
1905.....	128.5	281.5	410.0	31.3
1914.....	135.8	319.6	455.5	29.8
1919.....	125.5	454.5	580.0	21.6
1925.....	116.9	423.6	540.5	21.6
1929.....	108.7	313.4	422.1	25.8
1936.....	125.1	191.4	316.4	39.5
1937.....	191.7	225.0	416.8	46.0

¹ Year of formation of the Alaska Packers Association. *Salmon Fisheries of Alaska, 1893*. Ex. Doc. no. 31, 52nd Cong. 2nd Session (Washington, 1894), pp. 419-21.

² *Ibid.*, 1900 (Washington, 1901), pp. 28-29.

³ *Ibid.*, 1905 (Washington, 1906), pp. 13-16; also *Pacific Fisherman*, Yearbooks.

⁴ *Pacific Fisherman*, Yearbooks.

⁵ Estimated by authors. Not given separately after 1935.

able. The Columbia River combine also lost ground during the war and post-war period. In 1905 it contributed 31 per cent of the Columbia River pack and in 1919 and 1925 only 22 per cent. In the 1930's, however, it likewise increased in relative importance, packing 46 per cent of the total in 1937. Both concerns are in a position of leadership today in their respective areas, but both areas have been far outdistanced by Alaska as producing centers.

In the case of Alaska the change from the early days is more striking. When first organized in 1893, the Alaska Packers Association came close to monopolizing the entire Alaskan output. It packed 462,000 cases out of a total of 643,000, or 72 per cent. For the seven-year period 1893-99 its share rose to 80.2 per cent but in the decade ending in 1909 it dropped to 54.8 per cent. The next decade, 1910-19, brought a further decline to 25.8 per cent, and the following one, 1920-29, another drop to 14.0 per cent. During the eight years 1930-37 the Association packed 11.5 per cent of the Alaskan output, its share being 11.5 per cent in 1937.

What happened is apparent from Table 4. The earlier period of expansion in western and southeastern Alaska (see Figs. 5 and 6) was one in which the Alaska Packers Association shared the gains, although its growth lagged behind that of the industry as a whole. In the decade ending 1909 the company lost ground despite a doubling of its output. In the second boom period, 1910-18, its production remained more or less stationary, which again meant a decline in relative importance. This was the period of great expansion, especially in southeastern Alaska. With a tripling in the number of its canneries, this district came to supply half the total Alaska pack, its enlarged catch being chiefly pinks and chums, the cheaper grades of salmon. This expansion took place outside the field of the Alaska Packers Association, which continued to concentrate its efforts mainly in Bristol Bay, center of the higher-quality red salmon catch.¹⁴ Still the dominant firm in its own region, it now accounts for little more than one tenth of the total Alaskan output of salmon.

This brief survey of combinations in the salmon industry during the first 40 years of the industry will perhaps suffice to indicate the extent to which the concentration of control was carried in salmon canning. Paralleling a similar trend elsewhere in American indus-

¹⁴ In 1937 it packed about 32 per cent of the output in this district.

try, the years before and after the turn of the century witnessed a number of efforts at combination and consolidation, some successful and others less so. The motives were the familiar ones—the desire to rationalize production and transport on a larger scale, to raise prices by curbing output and instituting more orderly marketing, and perhaps also to participate in the promoters' profits likely to accrue from mergers and reorganizations.

What economic advantages may pertain to large-scale production in the salmon industry is a question which will be examined in the following chapter. At this point it need only be made clear that during this period nothing approaching a complete monopolization of the canning process was attained and maintained, even in specific districts. The industry was an expanding one, and the expansion was by no means confined to the larger combines. As we have seen, the principal concern in Alaska lost ground in the quarter of a century following its formation in 1893.

Little has been said as yet concerning combination in the important field of marketing. Before taking up the marketing system of the industry, however, it remains to examine further the process of combination in the canning field during the past 20 years, as will be done in the remainder of this chapter, and to analyze the advantages and disadvantages of large-scale organization in salmon canning—the subject of the next chapter.

THE POST-WAR ERA

Shortly after the World War the salmon industry showed signs of maturing into that state of equilibrium to which its economic position entitled it. Federal supervision over conservation, which was devised to build up the depleted runs along the Alaska coast and to place the industry on a permanent yield basis, had the effect of stabilizing the supply and of bringing a degree of harmony among the contending elements that were warring for control over fish supplies. With the adoption of general regulations in 1924 under the strengthened fisheries law of that year, there came more active policing of fishing waters, which for years had been done but half-heartedly. Destructive practices were held in check; research which had been developed on a scientific basis by certain individuals as a guide for regulation was introduced by the Bureau of

Fisheries into the problem of conservation; and escapement was gauged along more scientific lines.

The depression of 1921 was unusually severe on the salmon packers of the entire Pacific coast, coming as it did on the heels of an inflated war boom. The Federal government's cancellation of large contracts in 1919 and the return of unused goods threw a large supply on the already overstocked primary market. A severe break in prices resulted, which was accentuated by the depression of 1921. The calling of loans caused considerable distress selling, and the mortality of operating companies was heavy. The industry did not recover from this set-back until 1924.

The second important merger movement in the industry began in the middle 1920's, following the general demoralization of prices in 1921 and the collapse of the weaker companies. The larger concerns which weathered the storm began buying up smaller units, some of which were in a bankrupt condition. The primary motives behind the mergers were: (a) anticipated economies of production in consolidating plants, traps and marketing arrangements, (b) increased profits to be made in larger packs of the cheaper brands of fish, and (c) financing profits—a common phenomenon of the time.

The government regulations which enforced the spacing of traps in Alaska eliminated many traps owned formerly by large and small concerns alike. It placed the smaller concerns at a disadvantage, however, in that they were sometimes unable to utilize their remaining traps to the best advantage. The larger concerns operating in different territories were in a position to consolidate their holdings. By a process of mutual trading of traps and closing of scattered canneries they were able to effect a concentration of supply, which led to a lessening of operating costs in trap and plant operations.

These conservation regulations were promulgated with the object of lessening the intensity of fishing. With the increase in scope of operations, however, came other advantages to the larger packers. Many of the large concerns outfitted themselves with larger and speedier Diesel cannery tenders, which gave them a distinct advantage in consolidating operations. Hauls of from 100 to 200 miles from traps to canneries became common. Having a higher percentage of the catch, which guaranteed capacity cargoes, the

cheaper grades of raw material could thus be carried a greater distance at a lesser cost, and fewer canneries were required.

Other advantages for the large-size unit were also to be sought in superior bargaining power in negotiating with labor, in bargaining with fishermen in the determination of raw fish prices, in dealing with transportation concerns whose services are so essential to successful cannery operations, and in relations with governmental agencies in the matter of services or possible special concessions. However, the greatest apparent advantages which large-scale combination seemed to offer were, first, simultaneous operations in numerous fishing areas, which would avoid in part the hazards of variable fish runs, while at the same time affording a more dependable supply of high quality fish, and, secondly, a degree of market price support made possible by larger financial resources. A strong impetus to concentration of control came from the marketing end of the industry, the levers of control being the offer of better marketing facilities and of supplies of capital for needy operators. As noted in Chapter VIII, the large food processors and chains have come to play an increasing role in salmon canning.

The Post-War Boom

While the consolidation movement was inspired by the general trend of the times towards greater financial integration, undoubtedly it received its greatest impetus from circumstances within the industry itself. These were financial as well as technical. As noted in Chapter IX, the price of the cheaper grades of fish rose rapidly beginning in 1926. Chums increased in price from 75 cents per dozen in January, 1925, to a high of \$1.70 in June, 1928, or 126 per cent. Pinks rose from a level of \$1.20 to \$1.85 during this period. The rise in price was induced not only by the extremely short runs of these species, but also by better marketing techniques. The stronger financial position of the larger units enabled a better holding of stocks. It looked for a time as if the price of pink fish would ascend to the levels long held by the red brands. The new high price and the possibility of gains from the large yield of these species stimulated the consolidation of a number of the larger independent companies for the purpose of gaining a greater control

over the pack. The introduction of high-speed cannery lines in 1926 likewise offered an opportunity for processing the cheap materials on a larger scale as well as meeting the shortened seasons occasioned by conservation regulations. National advertising on a larger footing also offered the prospect of enlarged profits. Under these circumstances the process of consolidation received new impetus, taking the form of horizontal combinations of plants and of greater integration between production and marketing.

Competitive bidding in this boom period ran the prices of plants to levels never before attained in the history of the industry. Payments were made in cash secured from sale of capital stock sold to the public and through exchanges of common and preferred stock of the parent companies. One of the outstanding consolidations of this period, illustrating the process of horizontal combination, was the Alaska Pacific Salmon Company. This was formed in 1928 as an outgrowth of the old Alaska Consolidated Canneries which had risen some years before out of the wreckage of the 1921 smash.

The time was inauspicious, however. The prices of pinks and chums began to fall in 1928 along with food prices generally. This decline carried through 1929 and into the great depression. It was not halted until 1933, five years after the peak in 1928. The fall in the price of red salmon was equally precipitous, although it did not set in until 1930. The years following 1932 brought an irregular recovery, which stopped far short of the level of the 1920's.¹⁵ With prices spiralling downward and showing little prospect of regaining former levels, companies capitalized at boom price levels faced severe difficulties.

It is not surprising, therefore, that the new consolidation—Alaska Pacific Salmon Company—was not a financial success. The drop in salmon prices which carried through to the reaction of 1934 brought heavy operating deficits. As a result the company ran into financial difficulties and was reorganized with serious losses to stockholders. Today the company puts up one of the largest packs in southeastern and central Alaska, and was the fourth largest of all the American companies in terms of 1937 output, but its record of operating profits is relatively poor. (See pp. 188, 189.)

¹⁵ See Chapter IX.

Following the general business revival from 1934 to 1937, other important consolidations of canneries took place. The leader in this movement was the Pacific American Fisheries, Inc., which had begun the purchase of a number of companies owning canneries in Washington and Alaska as far back as 1924. Much of the new capital was secured by a stock flotation in local and eastern capital markets. The published reason given for the merger process was a familiar one—expected economies to be attained in closing unnecessary plants and in securing control over independent and poorly financed packs that threatened the stability of the market. Today this concern, the largest in the field, is reported to be in serious financial difficulties.

The British Columbia Packers Association, to which we have already referred, approximated the unfortunate experience of the American companies during these post-war years. An old firm, it purchased a large number of high-priced canneries in the late 1920's, paying for them in newly issued stock and also in cash. The consolidation proved unsuccessful and the company was forced into bankruptcy in the early 'thirties. It was taken over by banks and can manufacturing companies which had advanced considerable amounts of credit. Subsequently a number of its canneries were closed, and in 1934, the last year for which an estimate can be given, it accounted for about one third of the British Columbia pack.

The experience of the above consolidations shows that, while size has its advantages, it has not been without its drawbacks, especially from a financial point of view. A large investment in specialized equipment, kept idle for much of the year and in dull seasons, involves heavy overhead costs. In bad times the small firm has profited from the fact that much of its equipment is furnished by public service companies, can companies, etc., who supply rental equipment. Then, again, in years of falling prices the holders of large inventories—who often have bought up the weakly held stocks of small operators to keep them off the market—suffer grievously from inventory losses.¹⁶ These problems will be considered at greater length in ensuing chapters, but a reference to them at this point is obviously pertinent.

¹⁶ Witness the serious financial problems of some of the large packers in 1937 and 1938.

THE SALMON INDUSTRY TODAY

With this historical background in mind, it may be well to summarize the general outlines of the salmon canning industry today, particularly with reference to the number and relative size of firms engaged in production operations. The next chapter analyzes the advantages of the large firm and of the small in some detail. The net resultant of these factors in terms of existing conditions may appropriately be presented here.

The salmon industry, it may be recalled, is a relatively small one judged by American standards. It is outstanding among American fisheries and of great importance to the region where it operates, but it is not to be compared with the great, basic industries of the American economy viewed as a whole. The total value of canned salmon packed in Alaska, Washington and Oregon canneries amounted to \$55.6 millions in 1937. British Columbia plants added another \$12.0 millions, making a total for Alaska and the Pacific Northwest of \$67.6 millions. Other salmon products turned out by mild-cure and other processes, many of them carried on as adjuncts to the canning process, contributed several million dollars of additional output by the salmon industry. The American and Canadian industry as a whole represented a capital investment in 1937 of approximately \$130 millions in the form of cannery plants and equipment, fishing gear and floating equipment, and working capital funds. (See Chapter XI.)

Fishing operations themselves, as described in preceding chapters, are still organized to a large extent in terms of small units. Independent fishermen continue to account for a considerable portion of the annual catch, and the average investment per firm in vessels, boats, and gear is relatively small. Canneries are still typically small, whether measured in terms of value of output, investment or number of workers. As many as 177 canneries operated in 1937, 113 of them in Alaska. Although there are wide variations among individual plants, Alaska canneries averaged only 140 workers per plant in 1937.¹⁷ The average annual output of Alaska canneries is high relative to most canneries in other regions, but it was only 57,362 cases valued at \$385,000 in that year. In this latter connection, of course, it must be recalled that the working

¹⁷ Compiled from Bower, *Alaska Fishery and Fur-Seal Industries*, cited, 1937.

season is a very limited one, and consequently production figures hardly afford an adequate basis for judging the scale of organization here relative to that in other industries less seasonal in character. At best canneries operate at capacity only a few days during the year. Nevertheless, it is clear from these data and further details cited in other chapters that the production unit in the salmon industry continues to be relatively small. As indicated in Table 5, the industry fails to show the striking increase in output per plant which has characterized many American industries during the past 40 years. Although the average cannery today is larger than 40 years ago, the number of canneries has tended to increase *pari passu* with the growth of output, especially in the past 25 years.

Table 5. *Salmon Pack and Canneries of Alaska and the Pacific Northwest, 1900-38¹*

Year	Columbia River Can- neries	Pack (Cases)	Puget Sound Can- neries	Pack (Cases)	Alaska Can- neries	Pack (Cases)	British Columbia Can- neries	Pack (Cases)	Total Pack (Cases)
1900	16	358,772	19	460,450	42	1,548,139	50	606,540	146 2,982,901
1905	19	397,273	24	1,018,641	47	1,894,516	64	1,167,460	154 4,477,890
1910	15	391,415	24	567,883	52	2,438,777	58	762,201	149 4,160,276
1915	19	558,534	41	1,267,206	86	4,489,002	63	1,133,381	209 7,448,123
1920	22	481,545	11	166,520	143	4,395,509	50	1,187,616	226 6,231,190
1925	21	540,452	23	911,070	129	4,450,808	46	1,719,282	219 7,622,302
1930	21	429,505	12	572,606	152	4,988,987	59	2,221,783	244 8,212,881
1935	10	322,739	14	182,561	99	5,155,826	43	1,529,022	166 7,190,148
1937	11	416,830	13	441,874	116	6,654,038	37	1,502,522	177 9,015,264
1938	10	307,990	13	159,943	98	6,791,544	38	1,697,016	159 8,648,503

¹ This does not include the small pack of canneries located on the Washington and Oregon coasts.

Source: *Pacific Fisherman*, Yearbook numbers. Note that the Alaska canneries differ slightly in number from those recorded in U. S. Dept. of Commerce publications.

Dominance of Large Concerns

When it comes to the scale of business organization in the industry, the picture is substantially different. The 177 canneries operated in 1937 throughout the Pacific Northwest were controlled by 111 companies, giving an average of about 1 1/2 to each company. Such an average, however, conceals wide differences among individual firms. Nine large American companies operated 52 plants, and one of these concerns operated 11. As indicated in the foregoing account of the history of combinations a few large concerns together tend to dominate the field. The 4 largest American packers have a total investment of \$30 to \$35 millions, or about a third of the total investment in the salmon industry. The balance sheets reproduced in Chapter XI show that the leading concerns have assets running to \$10 million or more, in contrast to scores of

small independents whose assets range between \$25,000 and \$500,000. To take another criterion, out of 453 floating and pile-driven traps reported by the Bureau of Fisheries in Alaska in 1937, the 9 leading operators controlled 214, and the 5 principal ones as many as 171.¹⁸

The best indication of the variation among individual firms and the degree of concentration of control in the field of production is to be found in the distribution of the total pack by companies. Of the 111 companies operating in Alaska and the Northwest in 1937, the great majority individually contributed only a very slight proportion of the total production. In fact, there were only 9 American concerns, each one of which packed more than 2.6 per cent of the total American output. These 9 large operators together accounted for 58.3 per cent of the total production of canned salmon in the United States and Alaska,—4,384,600 cases out of a total of 7,526,000 cases. Individually, in order of importance, they were as follows: Pacific American Fisheries, Inc., 1,014,900 cases; Alaska Packers Association, 784,800; Libby, McNeill & Libby, 718,800; Alaska Pacific Salmon Co., 547,500; Nakat Packing Corporation, 354,400 cases; New England Fish Company, 269,100 cases; Columbia River Packers Association, 262,900 cases; Kadiak Fisheries Company, 231,000; P. E. Harris Company, 201,200.¹⁹ As noted in Table 6, these 9 concerns owned or controlled 47 per cent of the traps (excluding Columbia River) and 38 per cent of the canneries.

It is not to be implied that this grouping by size of pack has any associative significance, and it must be remembered that the pack of these concerns varies considerably year to year. The above figures give a good indication, however, of the way in which the pack is divided between a small number of large concerns and over 80 smaller ones in the United States and Alaska.

It may be noted that no single firm dominates the industry, the leading concern accounting for only 13.5 per cent of the total. The 4 largest operators produced 40 per cent, however, or almost as much as the 86 American concerns not among the 9 in first rank.²⁰ Moreover, in addition to selling their own packs a number

¹⁸ *Ibid.*, pp. 104-105.

¹⁹ *Pacific Fisherman*, 1938 Yearbook Number, pp. 59-65.

²⁰ Of the 111 concerns mentioned earlier, 95 operated in the United States.

of the large packer brokers market the output of many small concerns either on a commission basis or by outright purchase. In recent years the amount thus marketed has run as high as 7 per cent of the United States pack. Accordingly the importance of the 9 leading companies cited above in the selling field is somewhat greater than in production. In 1937 they handled about two thirds of the total American pack.

No one of the 9 leading firms operated in all 5 American districts in 1937—that is, in western, central and southeastern Alaska, Puget Sound and the Columbia River. Only one concern packed in 4 of these districts; 3 concerns packed in 3; 4 in 2, and the remaining one in only one district. In western Alaska, the chief red salmon area, 5 of these operators out of a total of 13 controlled 78 per cent of the canneries and put up 77 per cent of the pack. In central Alaska, chiefly a pink salmon region, 8 of these firms out of a total of 41 controlled 30 per cent of the plants and put up 58 per cent of the regional total. In southeastern Alaska, also a pink salmon district, 6 of these operators out of a total of 34 controlled 35 per cent of the canneries and put up 53.6 per cent of the pack. (See Table 6.)

With one exception the leading packers have not interested themselves in the Puget Sound operations in recent years, the reason given being the higher costs prevailing in that area. Operating costs are generally greater in this region due to the small pack per cannery which increases overhead costs per case. There has been a steady decline in fish runs in recent years, and the abolition of fish traps in 1934 worked to the disadvantage of the canneries. In recent years the average annual pack per cannery has even run below 20,000 cases in contrast to an average of from 85,000 to 110,000 per cannery for some of the larger packers in Alaska. One of the largest packs in 1937 was put up by a cooperative fishermen's packing organization. The operations of these 9 large companies in the various districts can be seen below, in Table 6.

Position of the Small Concern

Many of the small operators in the salmon industry occupy a rather precarious position, owing to the risks of salmon canning and their lack of financial reserves. On an average, each operates one or occasionally two canneries, together with two to three traps

Table 6. Operation of Salmon Canneries and Ownership of Traps by Leading Companies in 1937¹

Company	Western Alaska		Central Alaska		Southeast Alaska		Columbia River		Puget Sound		All Districts	
	Traps	Can- neries	Traps	Can- neries	Traps	Can- neries	Traps	Can- neries	Traps	Can- neries	Traps	Can- neries
Alaska Packers Assoc.	0	7	6	2	0	0	0	0	0	0	6	9
Pacific American Fisheries, Inc.	0	4	24	3	23	2	0	0	0	2	47	11
Alaska Pacific Salmon Co.	0	0	7	1	49	4	0	0	0	0	56	5
Libby, McNeill & Libby	0	4	12	1	30	4	0	0	0	0	42	9
Nakat Packing Corp.	0	1	0	0	20	2	0	0	0	0	20	3
P. E. Harris & Co.	0	0	8	1	7	1	0	0	0	0	15	2
New England Fish Co.	0	0	4	1	16	3	0	1	0	0	20	5
Columbia River Packers Assn.	0	2	3	1	0	0	— ²	3	0	0	3 ³	6
Kodiak Fisheries Co.	—	—	5	3	0	0	0	0	0	0	5	3
Total	0	18	69	13	145	16	— ²	4	0	2	214 ⁴	53
Total number in Districts	0	23	169	44	284	46	27	11	0	13	480	140 ⁴
Per cent owned by nine large com- panies	0	78%	41%	30%	51%	35%	0 ²	37%	0	15%	47% ³	38%

¹ Does not include canneryes owned by the companies but not operated in the 1937 season.

² Information unavailable.

³ Excluding Columbia River.

⁴ Including three canneryes on the Washington and Oregon coasts.

Source: Ward T. Bower, *Alaska Fishery and Fur-Seal Industries in 1937*, U. S. Dept. of Commerce, Bureau of Fisheries, Administrative Report No. 31 (Washington, 1938), pp. 99, 103-105; also *Pacific Fisherman*, 1938 Yearbook Number.

supplemented by independent fishing gear. The number of the smaller packers varies widely from time to time as a result of a relatively large number of business failures, sales of plants, etc. There is complete freedom in entering the industry, but governmental regulation restricting the number of trap sites, which are generally held by cannerymen to be indispensable for successful cannery operations in most districts, has prevented any expansion in this direction except by direct purchase of existing rights, usually expensive. The abundant capacity of the industry in plants, fishing boats and all types of gear also discourages the growth of small entrepreneurs at present.

Such conditions present hazards for both the large and small operators alike but are doubly hard for the small man. He is denied that minimum protection which larger-scale operations in many high-priced red districts afford, and his independence is restricted in part through necessitous borrowing from brokers, supply com-

panies and bankers who exercise a controlling influence as to scope of operations, holding of inventories, selling practice, etc. Nevertheless the independents afford a substantial element of competition by bidding for fish offered by independent fishermen and trap owners and by offering lower-priced canned supplies in the primary markets in competition with better known or advertised brands. Exclusive delivery contracts and the bidding up of raw fish prices by larger producers against the smaller concerns have been reported occasionally. This applies, however, more particularly to the early days of restrictive operations.²¹

Further light on the degree of competition in the salmon industry will come from a more analytical examination of the position of the large and small firms, as regards both production and marketing and the course of prices and profits in the salmon industry. This external view of the structure of the industry and history of combinations, however, suggests that it retains strong competitive tendencies. The picture is evidently one containing a balance of monopolistic and competitive elements—a balance which has been subject to historical swings but which reveals thus far no pronounced trend in either direction.

It is possible that competition in the salmon industry has been preserved historically largely through expansion. In the early decades this took the form of extending fishing and canning steadily to new areas—of geographical expansion for the purpose of tapping new runs.

In recent years new investment in the industry has taken the form largely of new technological units such as improved and enlarged canneries, floating and other equipment. If the industry is now entering a more stable era, one of retrenchment and of more orderly cultivation of its markets, we may witness a greater degree of community action centering around some of the transition problems facing the industry.

This suggests the need for a more critical analysis of the advantages and disadvantages of large-scale operation. So far we have viewed merely the external facts of size throughout the history of

²¹ These exclusive contracts should not be confused with those agreements arising from the financing of independent fishermen by packers which is carried on quite generally in the industry.

the industry, with little attention to its actual effects or to its bearing upon efficiency in canning, transport, finance and marketing. The next chapter will analyze the canning process from this point of view and the following one the structure and functioning of the market organization.

VII

THE LARGE FIRM VERSUS THE SMALL

NO QUESTIONS of industrial organization in the United States today are more insistent, or more controversial, than those centering around the issue of "big business." How big is American industry today? Is the "small fellow" passing from the scene? How far is the supposedly growing concentration of control in basic industries a product of economies inherent in large-scale organization? Is it in the public interest to encourage or resist any trend away from the traditional system of free competition among a multiplicity of small units each struggling for a place in the market and each controlled by competitive market forces?

The salmon industry, as we have seen, presents a mixed picture. If large firms have arisen in the industry, and if today they appear collectively to dominate the scene, they have not driven out the independent operator. Nor does any one of them approach a monopolistic position in the industry as a whole, however important single concerns may be in particular areas, and however the big packer brokers may pursue cooperative policies in certain respects. This condition prevails, moreover, despite the fact that the salmon industry as a whole is a relatively small one measured in terms of the American standard. Even if one firm should completely monopolize this field it would still be a small firm relative to the industrial giants to be found in the automobile, steel or utility industries.

We have now to analyze more carefully than hitherto the explanation for the scale of business organization prevailing in the salmon industry today. In Chapter V some attention was paid to this question as it relates to fishing operations. It was concluded that whatever scale of operations might be dictated by the process of fishing itself, the character of industrial organization here tends to be determined to a large extent by the organization of the canning industry, which dominates the field of fishing activity. The present chapter will examine certain factors tending to work

against or to favor the concentration of control in the salmon industry through large-scale organization at the processing level. Subsequently we will pass to a consideration of the marketing structure of the industry.

OBSTACLES TO SIZE

A set of factors in salmon canning which might seem to point to large-scale combination and the concentration of control are those which may be classed as purely technological—that is, those having to do with the canning process itself.

The nature of processing in the salmon cannery would seem to furnish in itself a well-nigh perfect basis for large-scale manufacturing methods. All of the requisites for standard design are present. The building, maintenance and operation of a typical cannery have always been fairly simple problems. Practically identical machines are required in all canneries. With a given standard specification in the raw material, which is largely built around control over the freshness of the fish, and with a degree of continuity in the supply during the canning season, the canning of fish is a simple, continuous process. There are no complicated mechanical processes involving the making of small parts later to be assembled in an elaborate product such as is found in many industries. Tolerances are broad; inspection is comparatively simple. The sizes and shapes of the package, though never very numerous, have been reduced to the lowest denominator through the process of simplification. The making of by-products is practically absent in most plants for economic reasons; no new products are introduced from one season to the next. Labelling, although complicated from a selling standpoint, is a very simple production process. Routing, dispatch, recording, maintenance are likewise simple.

In short, owing to the simplicity of plant and machine design and the narrow range of commodity types manufactured, the fish canning industry as a whole (and this includes the salmon, the sardine, the tuna, and other minor fishery product manufacturers), would be susceptible to large-scale methods and to concentration of control if other conditions were favorable. These are the circumstances which have led typically to the formation of large industrial units employing the technique of mass production in American industry.

The moderate size of the average firm in the canning industry

suggests, however, that there are countervailing forces tending to set limits to large-scale organization in this field. Bigness might come about in either of two ways (omitting, for the present, the process of vertical integration by which the various stages of the industry from fishing to marketing are combined under unified control). One is a growth in the size of cannery plants until a limited number of them account for the entire salmon pack. The other is the aggregation of separate canneries in the hands of a single firm which coordinates and directs the operations of all and consolidates the operations of transportation, buying, marketing, finance and managerial supervision.

The Optimum Size Cannery

Concerning the first type of consolidation it must be admitted that no adequate study has yet been made concerning the optimum size cannery from an efficiency point of view. As noted elsewhere, canneries grew in size with the introduction of improved fishing and canning technique—the fish trap, internal combustion and Diesel engines, the "Iron Chink," automatic feeder, closing and filling machines, etc. With the application of machinery and the rationalization of production methods came a considerable increase in output per worker, save where improved technique was offset by the depletion of fish runs. Prior to the introduction of the "Iron Chink" and of high-speed filling machines it required a crew of 300 men for an output of 3,000 cases per day. At present the same pack can be produced by a crew of 75 men. Such mechanization, together with the simplicity of canning processes as noted above, might be expected to enlarge the size of canneries and has undoubtedly done so in some degree.

Nevertheless, the average plant in Alaska today has only 2.13 machine lines¹ and has not increased greatly in size during the past quarter of a century. Some canneries contain as many as 8 or 10 lines; but plants as large as this are limited in number and are favored only where fish runs are extremely heavy. Many managers believe that a three- or four-line plant is most effective for max-

¹ A machine line is the unit of complementary equipment required for complete processing. (See p. 27.) Lines are classified as fast or slow, depending upon whether the automatic feeder and filling machine is included. Although not used on the Columbia River, the "Iron Chink" is found in about 96 per cent of the canneries of Alaska, British Columbia and Puget Sound. (Interview with manufacturers.)

imum per man output over a period of time. Experience seems to indicate that the optimum technological unit is relatively small and increased output usually results merely in the duplication of like-sized plants. This is shown not only by the size of the typical plant in terms of machine equipment but also in terms of labor force and value of output. Despite mechanization a good deal of labor is still required in cannery operations; even so the average plant in Alaska employed only 140 men in 1937 and produced an output of \$385,000.²

The relative smallness of the typical cannery is due apparently to three fundamental factors inherent in the industry. They are: (a) the size of fish runs in any one area, (b) the effectiveness of competition in fishing, and (c) the need for immediate processing near the point where the fish are caught.

Most of the fish runs in the rivers and outer fishing grounds are of limited size. Free fishing rights and the use of mobile gear as opposed to traps also tend to scatter fishing operations. Competition for fish supplies is not limited by any monopoly of gear, although the small operator tends to be barred from distant grounds by inadequate equipment and capital. Often severe, such competition adds to the natural dispersion of fish supplies as a decentralizing factor in canning.

Again, limitations upon the effectiveness of transport and refrigeration necessitate locating the cannery near the spot where the fish are caught. The relatively slow transportation afforded by cannery tenders and the absence of satisfactory refrigeration necessitate a short haul. Fish runs appear on very short notice, and may subside as quickly as they began. In some areas the season is no longer than four or five weeks, with the peak run over in half this time. Fish traps furnish storage, but their total capacity is limited. Since fish must be canned very shortly after catching (48 hours is the legal limit under the Alaska fisheries act), canneries must necessarily be dispersed over a wide area. This in turn places a limit upon the size of canneries.

In short, the need for immediate processing, the lack of rapid transit and suitable refrigeration, and the dispersion of fish supplies geographically under conditions favorable to fishing competi-

² Compiled from Bower, *Alaska Fishery and Fur-Seal Industries*, cited, 1937.

tion go far to explain the absence of large plants and of large-scale manufacturing methods.

Horizontal Combination

Despite these limitations on the size of the individual cannery, a concentration of production control might still be effected by horizontal combination—the familiar device of branch plants—if there were real economies to be achieved in unifying the operations of a number of canneries under centralized management. Were there substantial advantages in such combinations, one or more larger concerns might be expected to forge ahead and displace altogether the small operator.

The history of the salmon industry suggests that there are indeed certain advantages of this type. Some of them were cited in Chapter VI. Presumably it is because of these advantages that the industry has reached the stage of integration which it presents today. It must be observed, however, that the appearance of the industry also indicates that there are important limitations to the advantages of concentrating plant ownership. Only one instance can be found of a combination which controlled a substantial majority of the working canneries even in one region, and that occurred only briefly in the early history of the industry. While large concerns exist today, there seem to be limits upon the advantages of aggregating plants. Before proceeding to elaborate upon these advantages, let us observe briefly what appears to be the principal limiting factor so far as canning operations are concerned.

Tentatively, we believe that it is to be found in the difficulty of reducing managerial techniques in the canning industry to standard design. It is a commonplace in modern industry that the standardization of managerial operations is a prerequisite to the successful combining of plants under common ownership and supervision. The maintenance of managerial efficiency in such combinations is essential to successful concentration of plant ownership in the absence of a patent monopoly or some other offsetting factor. Yet it is just this problem which presents a serious obstacle to horizontal integration in salmon canning. Despite the simplicity of the canning process itself the standardization of managerial operations is virtually impossible. Under such conditions the attempt to impose blueprint overhead controls is fraught with difficulty.

The reasons are not difficult to ascertain. An extremely broad technological scope exists in the complete series of processes present in the typical operation; it covers fishing, marine transportation, plant construction and maintenance, power plant operations and manufacturing supervision. The latter includes many civic responsibilities as well, since the plants are often located in remote areas. While the manufacturing operations of canneries as such can be reduced to control board techniques through the instrumentality of design, the series of operation crises confronting management cannot be thus simplified. Let us note some of these unknowns. One is a storm at sea that wrecks traps and boats, cuts off the fish supplies and hinders the workers; another is a peremptory government order closing a whole fishing area; still others come from a shifting of fish runs or a fire that requires the closing of a plant or an immediate change of the season's operations to a new location. These and scores of other unpredictable events unique to frontier conditions, which are complicated by great distances and lack of adequate communication and rapid transportation, create a demand for direct, flexible and resourceful management such as is not frequently found in aggregated plants owned by large combinations in industry.

Many modern plants having personnel problems of the magnitude of those confronting the average cannery works manager would undoubtedly have a functional staff of considerable magnitude to assist in formulating and administering their labor policy. Yet in the cannery business this is handled as part of the routine along with other multiple duties and without the aid of any such staff. It can hardly be otherwise in view of the size of the plant.

A further difficulty in management is the shortness of the working season. As noted elsewhere, the majority of plants are practically abandoned for the entire year excepting for the short season in early and mid-summer. In some instances the entire runs may be put up in three or four weeks. Preliminary work, which may take from one to three and a half months in addition, is required to place the fishing apparatus and the canneries in condition for the season's operations. This seasonality of operations, calling as it does for active management for only a short period of time, with a far longer period away from the plant, hardly makes for managerial continuity and *esprit*. Relatively high wages are required to attract

adequate supervisory talent to the industry. The necessity of charging this expense to product over a short operating season tends further to militate against the hiring of requisite talent even when it is available.

In short, while the technical plant operations as such can be systematized to a high degree, there are many qualitative problems of such a nature that efficient managerial specialization and division of labor at this level of operations are extremely difficult to achieve. Up to the present the larger units in the industry have not devised a workable plan for large-scale branch plant supervision along the lines characteristic of large-scale American industry. Standard design in managerial techniques in operations is largely absent. The successful concerns are those with a definitely limited number of plants which operate under direct managerial supervision. This aids in explaining in part the failure of the larger concerns in expanding the number of their plants above an apparent minimum. Together with other factors previously mentioned it tends to favor competition in the industry at the processing level.³ These are the principal decentralizing forces at work.

Other Obstacles to Concentration of Control

Other circumstances, which may be characterized as essentially legal in character, tend also to restrict monopolistic concentration at the production level. They have already been cited briefly in Chapter V but may well be repeated here.

In summary form they are as follows:

- (a) The key factor in the salmon industry is control over supply—the more so because the manufacturing processes are simple, can be undertaken with no great initial investment, and hence are difficult to monopolize.
- (b) Because of its effectiveness as a fishing device, one of the most important single elements in that control of supply is the fish trap, which accounts for over half the Alaska catch.⁴
- (c) No trap site may be acquired in fee simple in Alaska. It may be acquired by obtaining a War Department permit and a Territorial license, the former to be renewed every five years

³ See also discussion of the marginal producer and possibilities of combination at the marketing level, pp. 121-22, and Chapter VIII.

⁴ For other discussion of the fish trap see pp. 21-23, 51-53, 63-64, 83, 87-88, 99, 107, 123.

and the latter annually. The site must be occupied continuously to maintain possession.

- (d) Such possessory rights are too precarious to justify large financial outlays necessary to secure control of plants, etc., through a public flotation of securities. The added insecurity of nonmortgageable property rights in this key factor makes well rounded corporate financing impossible.
- (e) The security of such control over supply as the trap may afford hinges upon two circumstances, both of which contain a large element of uncertainty. They are: (a) the competition of mobile gear, with a certain attendant threat that the practice of trap fishing may at any time be abolished, limited, or otherwise circumscribed by legislative action, and (b) a mere understanding in the industry as a whole, which amounts to an unwritten gentlemen's agreement, that priority of claim and use shall have first consideration in the allotment of trap sites.

A certain amount of precedent extending over a period of years has given a semblance of continuity to these "user" rights. Its breach is observed only infrequently. Nevertheless, the philosophy of political opportunism clothed in the garments of anti-monopoly, vested rights, conservation, etc., has made the defense of existing property rights rather difficult for the packer at times. To say the least, the precedent established by the state of Washington in legally abolishing the fish trap, has raised serious doubts as to the dependability of public opinion. This uncertainty of property rights, centering as it does upon the key factors of fish supplies, likewise is no guarantee of competition in the salmon industry. It does, however, make the packers sensitive to the charge of monopoly, and tends to discourage the costly investment and protracted effort which might otherwise be made to fasten unified control upon the industry.

ADVANTAGES OF LARGE-SCALE OPERATIONS

As opposed to these decentralizing factors there are clearly a number of counter forces at work tending to concentrate control of the industry, or at least part of it, in the hands of a few big concerns. It is easy to discover in the salmon industry those same

incentives to combination and large-scale organization which characterize American industry generally. Here as elsewhere the actual structure and operations of the industry represent a balance between centrifugal and centripetal forces.

For example, the typical desire to support the price structure by concerted efforts to achieve more orderly marketing and to restrict supply has not been absent from the salmon industry. Undoubtedly it was a large factor and perhaps the dominant one in the early merger movement. It is significant, to take a leading instance, that the formation of the Alaska Packing Association in 1892 was followed immediately by the shutting down of many canneries and the reduction of the Alaska pack by one half. In more recent years the fact that the process of combination has been furthered by the emergence of the large packer broker and the food chain as important elements testifies to the importance of the marketing problem as a determinant of the structure of the canning industry. There is a natural tendency to attempt to escape the pressure of external forces in a competitive market by creating the safeguards of a more unified control. Especially is this true in an industry into which entrance is relatively easy but which is subject not only to cyclical swings in consumer buying power but also to wide year-to-year fluctuations in the supply of raw material.

The marketing of salmon is examined in detail in the chapters which follow. At this point we are concerned primarily with the manufacturing process and the possibility which it presents for economies in large-scale production. A detailed scrutiny of the question would entail more elaborate technical study than we have been able to give it. Nevertheless, certain generalizations can be made which will stand the test of verification.

In studying the history of the salmon industry, one receives a strong impression that there are definite limits beyond which large-scale organization brings no substantial internal economies in the production process. Especially is this true in canning itself, for the reasons we have already pointed out. Up to a certain point a larger scale of operations and the closing of marginal plants clearly brought improvements in the early years. More machinery was introduced, per capita output increased, and costs lowered. This was more noticeable in the Alaska combinations than in those of the British Columbia or Columbia River districts.

Given the technical character of canning operations and the character of fish supplies as already described, however, large combinations of canneries seem to have afforded few gains from specialization in the manufacturing process itself. The product is rather standardized and homogeneous on the whole. Moreover, while red salmon are fairly well localized in western Alaska waters, the different grades are not typically concentrated in particular localities. As a rule the cheaper grades are caught with the better ones and are processed in the same plant. No widespread economies from plant specialization are possible.

Again, in the matter of by-products little advantage has resulted from the large consolidations. Widely scattered plants prevent easy concentration of by-product supplies. The absence of suitable storage facilities and the remoteness of the principal market for the finished product—the agricultural South—have hindered any large-scale development of fish by-products as an auxiliary to the canning industry.

As already observed, one important saving from large-scale operations has come in the field of transportation, an indispensable adjunct to fishing and canning operations. The introduction of gas and Diesel engines has permitted larger and more powerful fishing craft and cannery tenders. These carry larger crews, use bigger gear over wider fishing areas and haul heavier cargoes with greater rapidity to canneries and fresh fish markets. This improvement in transport equipment, together with the use of larger nets and of traps, has worked cumulatively to increase output, lower costs, and to speed production. Not all of the gain has accrued to the large operator, but the technological trend has undoubtedly facilitated mass production and favored the larger firm.

In addition, there is the special circumstance that the companies operating in more remote areas have not been able to rely on the common carrier in moving crews of men and cargoes of goods to and from the fishing grounds to any great extent. This fact has set a definite premium on financial size. For example, the Alaska Packers Association, operating chiefly in Bristol Bay, a region not formerly served by transportation lines, soon built its fleet to considerable proportions. It derived an important advantage over smaller competitors from the fact that it was large enough to provide more adequate facilities for carrying crews and supplies north-

ward and the finished product south. Here as in other respects the question of capital is of decisive importance. One of the primary potential advantages of the large firms, and an important stimulus to combination, has lain in the field of finance—in preferential access to the sources of capital.

Bristol Bay, where most of the large packers operate, is the best illustration of the dominance of the large firm. Seven big packers accounted for 91 per cent of the total output of western Alaska in 1937.⁵ The reasons for their preponderance are four-fold. The first is the relative isolation of the region which demands a considerable investment in floating equipment. The public transportation facilities north of the Aleutian Peninsula, from the beginning of the industry in the 1880's almost to the present, have not been wholly adequate for the needs of salmon fishing and processing. A second reason is the high idle-time cost of the floating equipment which is unused the major part of the year, thereby creating a high overhead cost which the small concern cannot absorb. Thirdly, the cost of cannery construction is relatively high because of longer transportation hauls, the absence of local building material in the district, and a relatively higher labor cost. Practically no skilled or common labor resides in the region; the majority of laborers are imported from the states. Fourthly, cannery operating costs in this district are the largest of any in the industry because of the higher wages, fish costs and transportation rates on cannery supplies.⁶

Lest this description of conditions in Bristol Bay create a false impression, however, it should be added that it is too extreme to be altogether typical of the industry as a whole. Similar factors have tended, it is true, to produce a considerable concentration of plant ownership in other areas; but it would be erroneous to draw too sweeping a conclusion therefrom. Today, for example, it is generally believed by representative elements in the canned salmon trade that the balance of power lies in the hands of certain large

⁵ The Alaska Packers Association, Columbia River Packers Association, Libby, McNeill & Libby, Pacific American Fisheries, Inc., Nakat Packing Corporation, Red Salmon Canning Company, and the Bristol Bay Packing Company. The reds caught on the Peninsula, at Chignik, Karluk, Alitak, Snug Harbor and other locations in central Alaska, are packed and sold in large part by the same concerns operating in Bristol Bay. *Pacific Fisherman*, 1938 Yearbook Number, p. 59.

⁶ Cf. pp. 196, 197.

independents rather than in the hands of the big packers, insofar as price control over reds, pinks and chums is concerned. A number of these concerns whose names are familiar to the canning industry, located in central and southeastern Alaska, are in a position because of their low costs and excellent financial condition to challenge any undue raising of quotations in the primary markets. The advantages of these independents are to be found in a number of factors. They are: (a) individual strategic fishing locations which afford concentration of a large cheap supply, (b) low costs of fishing and packing operations, (c) nearness to economical and dependable coastwise transportation facilities for obtaining necessary packing supplies, labor, etc., and for marketing their finished product, (d) efficient, direct personal management which is so necessary for successful operations in the industry, and (e) adequate financial reserves necessary for carrying packs through the selling season. It has never been true that the biggest concerns had the field to themselves.

THE MARGINAL PRODUCER

No distinction between the largest packers and those next in size, however, can obscure the fact that a considerable fraction of the total salmon output has come to be produced by a relatively small number of firms. It was noted in Chapter VI that the nine leading American firms produced 58.3 per cent of the salmon pack, while the remainder was divided among 86 others. These large concerns enjoy considerable advantages in competition with the smaller, marginal operators. If the advantages of size have not led to the monopolization of the industry they have nevertheless made the position of the marginal firm somewhat precarious, and have often reduced him to a position of dependence on can companies, sales agents and large packer brokers who, in one way or another, supply him with working capital and dispose of his product. These marginal operators are those upon whom any overintensification of fishing activity depleting the salmon reserves would bear with especial weight. It is appropriate, therefore, to examine their position with some concreteness of detail even though it involves a recapitulation of much that has already been said. In so doing we shall gain a more vivid picture of the precise problems facing the "small fellow" in this industry.

The salmon industry from its earliest inception on the Pacific coast in the 1860's has been characterized by the cyclical presence of a large number of relatively small operators. As noted elsewhere, the first canneries were simple handicraft units, frequently built on scows which were floated to and from fishing sites. Never very elaborate or costly, they furnished an ideal activity for the enterprising individual of limited means who was willing to pioneer in new ventures and in new territory.

With the coming of larger markets, however, the small producer was outdistanced in his race for dominance in the industry. The introduction of larger-scale production methods, following technological improvements in fishing and canning, placed the industry in the hands of larger capitalist-owners. Many of these had financial interests outside of the salmon packing business: in the lumber, logging, mining, shipping and manufacturing industries along the Pacific coast. They were often operators of substantial means, and, having better credits and financial reserves, could expand their operations into several fishing territories simultaneously and thus spread part of their cannery risks. Many were better able to finance their inventories over dull periods without the necessity of forced selling. They could also carry their salmon cannery investments over periods of depression without a danger of financial failure equal to that confronting the smaller operator.

The Production Problems of the Small Packers

The advantages of the larger producers were reflected, for example, in their acquisition of superior plant locations—i.e., locations favoring large catches of fish and low production costs—which yield them an "economic rent." Some of the less desirable cannery sites are unfavorable from a transportation standpoint. The shipping of supplies, equipment and labor which must be made in sea-going vessels from the states, necessitates deep water at the docks for berthing such vessels. Other requisites for favorable locations are nearness of water supplies needed for community purposes, plant operations and power generation. Proximity to settlements where labor and supplies may be secured is also a desideratum. While there is an abundance of sites in all operating territories on which plants could be built, nevertheless they must be placed strategically with reference to all the economic factors involved—

raw material supplies, water transportation, cheap power, water and labor—in order to compete successfully. Most important of all factors is nearness to fish runs.

Through purchase, lease, or original filing the large concerns tended early to acquire the best fishing trap sites and cannery locations. In some instances they forced their competitors out of business, though often we hear of cases of mutual aid given to small operators. The large concerns possessed several plants in different fishing localities with a sufficient number of traps, and were able to own or control (by contract) the mobile gear so necessary for furnishing an abundant and much needed continuity in supply. Frequently mutual transfers of trap sites were made between the larger firms. Having only a limited number of traps, the smaller concerns were denied this advantage.

The marginal concerns frequently operated in the fishing, canning and sometimes curing business as a sole activity. Coming later into the field sometimes, they were obliged to content themselves with the less productive trap sites. Frequently they lacked the capital required for searching out the best fishing locations. Often they had an insufficient number of traps in one location to fill their cannerys. Sometimes they were forced to take the less desirable cannery sites located at great distances from fishing grounds. Often they had a mixture of several species of fish in one stream, a condition which did not allow of specialization sufficiently to permit them to become dominant market factors in any one line or brand.

Lacking a sufficient number of good trap sites and capital for owning boats and gear, the marginal producers tend to bid for fish from seiners and occasionally gill netters. Often the price is bid up against larger concerns, which resort to the same practice in order to cripple the small fellow. This often results in increased costs to all operators, with the small ones least able to pay it. Not infrequently the quality of the latter's pack is not the best as spoiled fish are sometimes utilized because of reluctance to discard them. This tends to reduce the general standards of the industry as a whole.

The Financial Problems of the Small Packer

The small packer's shortage of working capital is reflected in the lack of proper facilities for financing purchases of fish and packing

supplies. It is said in the industry that the can manufacturing companies have freely extended credit to the small fellow. In their desire for container sales the can suppliers have been responsible at times for the influx of small producers. They supplied them with machinery on a rental basis, and "cans on the cuff" to be paid from the sale of the pack at the close of the season. The first investment was placed in a cannery building which would then be outfitted with rental equipment; sometimes supplies would also be furnished by the can and other supply companies. It is also a common practice for sales agents and large packer brokers to finance the smaller canneryman in order to secure the privilege of marketing his pack. The former may wish to secure a greater range in quality of pack to satisfy their own markets, and will foster an independent to afford a ready supplement to their supplies from other sources.

Despite the importance of abundant working capital in this industry, bank credit is not usually available to the small producer because of the serious financial hazards involved. As noted previously, a major risk comes from the necessity of advancing half of the entire cost of the pack before operations are started, before the pack can be predicted, and before the selling season opens. Fishing and cannery supplies are purchased, traps installed, fishing boats and gear prepared in advance. This outlay is higher per unit of output in the salmon industry than in many industries of this type because equipment, supplies and workers must be transported great distances and at considerable cost. Wages are guaranteed in many cases for the entire season. The average advance capital for all canneries in Alaska is slightly over \$70,000 per cannery per season, and runs as high as \$250,000 in some instances. The ratio of working capital to fixed assets is typically high, while that of current assets to current liabilities is universally low.

One large element in the above-mentioned risk is the variability of the fish runs. The capital advances are often frozen to one location. If the run fails to materialize or if through governmental regulation the fishing area is closed—and either may occur—the salvage of the season's investment is not high. A small canneryman is rated a poorer risk than the fisherman; the latter must follow the usual convention, found in practically all the fisheries, of owning

the first investment—the boat hull—before loans may be secured. This custom gives a degree of protection to the lender.

Losses associated with risks of this type in the salmon canning industry have tended to eliminate the extremely small packer from time to time and to leave the relatively stronger concerns in the field.

Marketing and the Small Concern

The smallness of his pack likewise prevents the small operator from building an independent sales organization. He must deal with the broker or the packer broker who can purchase, hold and successfully market his product. Shortage of capital often forces him to unload early in the season in order to pay his supply and wage bills. Frequently he contracts his sales ahead of the opening price to secure advances on his pack. Characteristically he represents the distress seller in the market. His condition sometimes forces the major operators and the large brokers to purchase the rather voluminous independent pack to save the market from demoralization. The large concern may purchase at any time of the selling season when the small operator is obliged to liquidate. Sometimes the stock is taken at a loss to the large packer.

In short, viewing the position of the small packer as regards production, finance and marketing, we find that he tends usually to occupy a marginal position in the industry. If the advantages of large-scale operations are not sufficient to oust him from the field, he is nevertheless least able to withstand adversity. This means that losses occasioned by a decline of consumer demand or by the introduction of new competition would fall upon him with especial severity. Many such concerns, already handicapped through inability to spread their present risks, would be forced out of the salmon industry, and the pressure of competition here would spread to other fields of fishing activity as well.

VIII

THE MARKETING OF CANNED SALMON

THE FOREGOING discussion of the small operator has already anticipated the problems of salmon marketing which form the subject of this chapter. Increasingly since the early days of the industry the question of providing a satisfactory market has come to the fore. If the pre-war merger movement was concerned primarily with production organization, that of recent years has been impelled more largely by the needs of distribution. In this respect the salmon industry reflects a dominant trend in American industry as a whole. Nor is this statement contradicted by the fact that the need for capital has been a major force driving towards consolidation. Capital needs are associated in part with the problem of marketing a highly seasonal product, and new sources of capital have been opened up to the production organization through its becoming linked more closely with powerful distribution agencies.

Vertical Integration

This suggests what is the most striking development in the marketing structure of the salmon industry: the trend towards vertical integration. A good deal has been said thus far of the process of horizontal combination in the canning industry and of the conduct of fishing and canning operations under unified management. It remains now to trace the progress of combination at the marketing level. Concentration of control appears in some degree in both its familiar forms—the dominance of the market by large sellers, and the tying in of selling organizations with production organizations in one way or another.

Here again, however, it should be made clear that we have to deal not with monopoly in its simple all-inclusive sense but rather with a certain balance of monopolistic and competitive elements. In many respects salmon marketing is severely competitive not only as regards the position of the product relative

to other foods but also in the internal organization of the market. This is shown by the behavior of salmon prices and by the known facts of the distribution system with its dynamic changes in recent years. On the other hand, as we shall see, this stage of the salmon industry reveals the familiar attempt to shift business control from competitive market forces to the decisions of corporate business units operating with some degree of voluntary or involuntary cooperation. Here, too, as elsewhere in American industry the motive force is not only the drive for immediate profits but also the desire for security—for the avoidance of risk.

The chief characteristics of the distribution system are dealt with in the present chapter. Following a brief summary of the scope of salmon markets and the physical facilities for handling the product, the marketing structure will be analyzed in terms of organization and functioning. This will be followed in Chapter IX with a general account of the course of salmon prices in recent years. We shall concern ourselves only with the canned product, which accounts for three quarters of the total product of the salmon industry. Most of the remainder of the catch is consumed fresh, the balance being salted, smoked, frozen, etc.

THE MARKET FOR SALMON PRODUCTS¹

The marketing of salmon products, like their processing, is rendered simple in certain respects by the fact that canned salmon, the principal item, is homogeneous and standardized in character, and is subject only to variations in grade and quality. It is also nonperishable, and hence does not present the transportation and refrigeration problem involved in many food products. On the other hand, packing operations are concentrated in a few summer weeks, thus necessitating the seasonal storage of the product on a large scale. Moreover, while production is centered in Alaska and the Northwest, consumption is widely distributed over the United States and is especially high in the more densely populated eastern areas. In addition, a little over 10 per cent of the total pack is customarily sold abroad, mainly red salmon for the British market.

¹ For a more concrete analysis of salmon marketing, see David B. DeLoach, *The Salmon Canning Industry* (Corvallis, Oregon, 1939), Chapters 8 and 9, from which many of the facts in this chapter were drawn.

The production of salmon in North America has grown steadily, rising from an annual average of 2,160,000 cases in the decade 1891-1900 to an average of 8,557,000 in the eight-year period 1931-38. With this growth in volume has come an increase in the scale and complexity of the marketing structure. The following table shows the average annual production of canned salmon (in cases) by decades from 1891 to 1938:²

1891-1900.....	2,160,000
1901-1910.....	4,180,000
1911-1920.....	7,600,000
1921-1930.....	7,530,000
1931-1938.....	8,557,000

With due allowance for changes in imports, exports, and carry-over of salmon, it is obvious from the foregoing production figures that per capita consumption of salmon increased markedly from 1890 to 1920. The growth of sales far outran the population increase of Canada and the United States, with the bulk of consumption taking place in the latter country. During the decade ending 1932, per capita consumption was remarkably stable, ranging between 2.02 pounds in 1925 and 2.26 pounds in 1929 and 1932.³ Throughout the depression the consumption of salmon held up surprisingly well, due in part no doubt to low prices prevailing through this period.⁴ Per capita consumption in the six-year period 1933-38 has likewise varied between two and three pounds except in 1936, when it slightly exceeded the latter figure. It is of interest to compare this with the average per capita consumption of lean meats and fish as a whole which has amounted to 132 pounds for the period 1920-37. The trend of consumption of this food class has been downward,⁵ whereas for canned salmon it has been constant or slightly on the increase.

Areas of Consumption

In general the better grades of salmon are consumed in sections of the United States where the income level of the people is

² This table shows United States and Canadian production combined. Figures for 1891-1900 compiled from Cobb, *Pacific Salmon Fisheries*, cited, p. 554. The others were compiled from *Pacific Fisherman*, 1939 Yearbook, p. 85.

³ DeLoach, cited, p. 63.

⁴ See Chapter IX.

⁵ "Consumption of Agricultural Products," *The Agricultural Situation*, Jan. 1939, p. 15.

relatively high, and the lower grades where standards of living are low. This holds true as well for the foreign markets supplied from this country. The foreign demand for the red species is found largely among higher income groups in the British Empire. The same situation is believed to prevail on the Continent.⁶ Domestic consumption of reds, chinooks, cohos and the better quality of pinks centers most importantly in the New York-New England area, with Illinois, Michigan, Minnesota, Wisconsin, Iowa and the Pacific coast states as secondary markets. The cheaper brands, especially chums, find their greatest demand in the South. Here the consumption of the product is directly affected by the price of fresh meat, chiefly pork. For pinks the heavy consuming states outside the South are Illinois, Pennsylvania, Ohio, Iowa, Wisconsin, Indiana, Kansas and Oklahoma.

The main distribution of salmon by rail extends as far east as Denver and Minneapolis in the central areas. New York, Pennsylvania, and the New England and Atlantic coast generally are supplied by water transportation through the Panama Canal. The latter is also used for the southern shipments to New Orleans, from which point cargoes are carried by barges to points on the Mississippi River. St. Louis is an important distribution center for the South.

Transporting, Storing and Shipping

The mass shipment of canned salmon from the northern canneries to the salmon terminals constitutes one of the major movements of canned goods in the country. It is an annual occurrence that takes place between the middle of June and the end of September. At the close of the canning season the fleets of the packers, privately owned vessels and common carriers are loaded with the season's pack and started for Seattle, Bellingham, Tacoma or San Francisco, where the canned goods are placed in public or private warehouses for storage. These cities comprise the terminal or primary markets in the United States for the domestic and foreign distribution of canned salmon. The packs of Puget Sound and Columbia River canneries are usually kept in the cannery warehouses until sold. Small canneries must

⁶ Interview with leading packer broker.

find a storage place for their products in addition to placing them in a salmon trading center for sale and distribution.

As a result of the concentration of the salmon trading activities in Seattle there has been corresponding improvement in port and transportation facilities for handling the product and a growth of selling agencies, brokerage firms and financial institutions that specialize exclusively in canned salmon. The port of Seattle maintains eight terminals for the fisheries industries. All provide storage space for canned products; two maintain cold storage and freezing plants of tremendous proportions; while one operates a cannery in conjunction with fresh fish activities. Facilities for the storage of canned salmon, as well as frozen fish products, are available in the ports of Astoria, Tacoma, Bellingham and San Francisco. The port of Vancouver, British Columbia, has developed terminals which are utilized for storing and shipping the Canadian pack, while some of the American pack is handled in bond through Prince Rupert in the same province.

The major portion of the sales orders are taken well before actual shipments are made. Limited quantities are sold even before the canning operations are started. The Alaska product is received in Seattle markets from July to October, thus making possible early financing of the pack where pre-packing loans are not available. Naturally there is heightened activity in the selling and shipping departments and at the salmon terminals during the time of maximum receipts from the north.

Shipments to the various buyers in the secondary markets are made throughout the entire year. The high point of the movement is reached during the months of August and September following the closing of the canneries in Alaska and the states. The low point usually occurs in the months of February and March. Producing areas other than Alaska, notably the Columbia River, furnish the market with supplies of salmon from the first of May until the end of November. A late fall supply coming from the Columbia River, Puget Sound and the Washington coastal districts extends the canning and shipping operations some years until early December. Off-peak supplies are sold during the winter and early spring months while the canneries are closed and, if not disposed of, become the carry-over for the ensuing year.

The transportation, storage and financing of the pack in the primary market are done at the producer's expense. Normally title to all merchandise remains with the packer until shipment to the purchaser. The assumption of the risks of holding, which often is not inconsiderable, is the producer's responsibility. As noted elsewhere, no futures are sold.

THE MACHINERY OF DISTRIBUTION

The development of the present machinery for the distribution of canned salmon is the result of several complex economic factors. They are: (a) localization of the major part of the production and marketing activities in the northwest, (b) the short duration of the canning activities in all districts, owing to the seasonal nature of the runs and to legal restrictions, (c) the nature of the product, (d) the concentration of the pack in terms of ownership, and finally (e) the existence of an unusually large number of small producers having limited operating capital and therefore limited ability to withhold supplies from the market.

The early salmon packers had no independent sales organizations and in the main were forced to rely upon wholesale grocers and eastern brokerage firms for markets and for financial aid. Specialization in the marketing of canned salmon came later with an enlargement in the scope of operations brought about by an increase in the volume of sales. The selling agent, or factor, arose to take over the marketing function from the grocery wholesalers. He remains today an important element in the selling organization of the industry. With the growth of more powerful salmon canning companies, however, resulting from mergers and consolidations, and the coming in of the large food packer, a material change took place in the methods of marketing. The packer broker, or the sales department of the packer, came to be a dominant part of the marketing structure. No longer was salmon packed largely by independent cannerymen who confined their attention to production and left marketing to wholesale grocers and sales agents. Marketing arrangements took on new forms with the integration of producing and selling operations through chain store systems, general food processors, and sales organizations linked in various ways with the canneries.

Today selling organizations may be grouped into two major categories: (a) the sales agency, and (b) the packer broker. The first is the typical orthodox broker, the independent selling agency or factor. The second term, for the purpose at hand, includes the leading selling organizations tied directly or indirectly to a major packer.

A study of the industry by the United States Federal Trade Commission published in 1919 revealed that 80 per cent of the salmon pack was then marketed through the medium of "selling agents."⁷ This included a broad classification of the sales factors; some were strictly independent agents, others were directly affiliated with large packers through stock ownership, loans, etc. The Commission reported that out of a total of 115 plants reporting in 1917 53 canneries sold their entire pack and 24 canneries a portion through "sales agents."⁸ At the same time 18 canneries sold entirely through general (food) brokers and 32 partly through them.

In 1936 approximately 64 per cent of the total United States pack was marketed by 8 leading packers and their affiliated sales agents, or 5,790,000 cases out of a total of 8,983,000 cases. Approximately 750,000 cases of independent packers are included in these figures,⁹ with general food brokers accounting for approximately 15-20 per cent.¹⁰ In 1937 the American pack was marketed by some 18 sales concerns, including the large packers and their exclusive sales agents. Only two of this list were classified as non-specialty sales agents. The nine leading packers (including large packer brokers as well as firms with sales departments) accounted for approximately two thirds of the pack, the balance going to independent sales agents. The majority of the latter group were exclusive salmon dealers.¹¹

The Independent Broker

The older type of marketing arrangement is that involving the independent broker. He may deal exclusively in salmon or may

⁷ U. S. Federal Trade Commission, *Report on Canned Foods, Canned Salmon* (Washington, 1919), pp. 21-23.

⁸ "A sales agent is a broker who has the right to sell all or a specified part of the canner's output or to dispose of all of it except the portion sold to certain persons or in specified places." *Ibid.*, p. 21.

⁹ *Pacific Fisherman*, 1937 Yearbook Number, pp. 67-71.

¹⁰ Interview with brokers.

¹¹ *Ibid.*

be a general food broker who assembles various foodstuffs, one of which is fish, and redistributes them through the ordinary jobber-wholesaler-retailer trade. He provides an important channel through which the small canneryman may clear his pack if the latter has not obligated himself to sell through a large packer broker. Often the selling agency financially tied to a large packer may also serve as a sales outlet for the independent canneries. In one way or another the distributor attempts to secure a dependable supply of varied species to satisfy the market.

Columbia River salmon are still marketed in part through brokers in New York and London, according to DeLoach.¹² Much of this high grade product is sold on the Atlantic coast and in England and goes directly from the canneries to these eastern selling agencies. Increasingly, however, it is now disposed of in the primary markets on the Pacific coast. Columbia River canners are also creating their own sales departments for direct selling, and the large companies operating in other areas are likewise acquiring Columbia River canneries in order to add chinook salmon to their line of products.

"Selling agents and brokers provide the salmon packers with the principal means for marketing their products in foreign countries.¹³ Inasmuch as the sales of canned salmon are extremely small in all countries except in the United Kingdom, the general policy is for the primary-market selling agents to establish a working agreement with general export brokers. Such firms have their foreign representatives who carry on the necessary sales work in their country. With the exception of a few direct sales between packers and large buyers (wholesale), the export market for canned, frozen and mild-cured salmon is in the hands of a group of general brokers who specialize in the export trade. Under conditions of this kind, salmon might constitute a large part or a small part of the merchandise sold abroad by a given brokerage concern.

"The agreement between the primary agents and their foreign representatives is sometimes based on a written contract, but usually it is merely a mutual understanding between the two

¹² DeLoach, cited, p. 78.

¹³ Approximately 11 per cent of the American pack was exported during the decade 1929-38.

parties. A stipulated commission is paid to the foreign brokers on each sale. Terms of sales are usually cash, f.o.b. Pacific Coast shipping point, or cash on arrival."¹⁴

Packer-Broker Combinations

As noted above, the principal recent trend in salmon distribution has been away from the independent selling agent and in the direction of some form of financial integration between the canner and the selling organization. The impetus to such integration has come from the market itself, and the levers of control possessed by the sales organization in effecting such integration have been its superior contact with the market and with sources of capital for the industry.

The dominant problem of the selling agent in the salmon industry has been two-fold: (a) to build up a demand for canned salmon products bearing their own identified brands, and (b) to secure an adequate supply of quality products from a broad list of packers able to furnish high grade goods on which to place their own labels. The attempt to control supply has resulted in both selling agents and brokers becoming interested financially and otherwise in the salmon packing business. This attempt to expand vertically from the marketing level is more pronounced today than at any time in the past. Instances of the close relationship existing between the brokers and the cannery operator are very common, although the types of relationships are diverse.

The importance of such integration in the market today is indicated by the fact that, as noted in Chapter VI, the nine big packer brokers sold approximately two thirds of the total salmon pack of the United States and Alaska in 1937. Included in their sales were small amounts of the pack of small, independent cannerymen who disposed of their pack through the large distributors. This concentration in marketing was typical of the pack of each of the three Alaska districts, and on the Columbia River where two concerns accounted for 52.5 per cent of the pack. It is clear that the big packer broker or the sales department of the big packer dominates the field of distribution.

This second general category of selling organizations—those

¹⁴ DeLoach, cited, pp. 78-79.

tied directly to the large packers—includes a number of different types of arrangements.

There are numerous sales agencies (a) financially interested in the packer through loans and advances, though nominally independent, (b) owning all or a substantial portion of the cannery stock, (c) being owned in whole or in part by the packer, (d) being owned, together with the packing firm, by a third party. The agent may have an exclusive contract with a packer for his entire output. He may be merely the sales department of a large packer, and may market part of the independent pack in addition. He may sell through large food brokers, who in turn supply wholesalers, or he may sell directly to wholesalers.

As observed in the previous chapter, it is a common practice for large distributors to finance the small cannerymen in order to secure the right to market his pack. The small operators are characteristically short of capital, both for fixed equipment and to finance the season's operations. Unable to provide independent selling organizations, they are likely to turn to the large distributor to purchase, hold and market their pack. The sales agent or packer broker, in turn, often requires a greater range in quality or additional supplies as "fill-ins," or, on occasion he may acquire independent stocks in order to support the market price which at times breaks below cost.

A part of the salmon pack is also marketed through large food-packing combines owning fish canneries as well as other food processing establishments. Here the cannery is a subsidiary unit in a large combination which markets its salmon through the regular channels employed for the distribution of general foodstuffs.

The California Packing Corporation, with its subsidiary, the Alaska Packers Association, and Libby, McNeill & Libby serve as illustrations of the expansion of large food packing concerns, either directly or through a holding company device, into the salmon packing business. The California Packing Corporation, which owns or controls several score of food canneries in the country, acquired 79 per cent of the stock of the Alaska Packers Association in 1916.¹⁵ The Alaska Packers Association markets its products through the California Packing Corporation in the

¹⁵ Moody's *Manual of Investments*, 1916.

United States and through Balfour, Guthrie and Company in England. Marketing of canned salmon takes place from the primary market in San Francisco by direct shipments to the purchasers.

The selling activities of the California Packing Corporation are directed primarily toward wholesalers, chain stores, large buying groups, and large buyers such as state institutions and steamship lines. Salmon is merely a part of the complete line of canned food marketed by the company. All advertising and other expenses essential to the marketing of canned salmon are borne by the California Packing Corporation. The Corporation also serves as a selling agent for several smaller salmon packing concerns in addition to marketing the pack of its own subsidiaries.

Libby, McNeill & Libby, another large food concern, operated nine canneries in Alaska during 1938 to supply its trade. These canneries ship their output to the "Salmon Branch" of the company in Seattle, where it is stored until orders are received for shipment to the various branches of the company. The method used by the company to distribute its canned salmon may be described as follows: (a) when orders for salmon are received, they are telegraphed to the "Salmon Branch" and shipments are made direct to the buyers, in this case usually large wholesalers or chain stores; (b) sometimes a small part of the Libby pack (about 15 per cent) is marketed through a regular brokerage channel.

Pacific American Fisheries, Inc., one of the oldest companies in the field, engaged in the packing of fishery products only, has established its own selling organization (Deming and Gould Company), which maintains its own broad connections in the secondary markets of the country. The distribution methods here are similar to those of the general food packers. The relationship between the sales department and the brokers is retained by paying a stipulated commission.

A final variant in the packer-broker series is the producer-retailer combination, which has assumed increasing importance in recent years. Here the packer is a producing adjunct to a chain store distribution system. Illustrative of this type of organization is the Nakat Packing Corporation—Great Atlantic and Pacific Tea Co. chain—for which Seattle is the operating and marketing center. Wherever the large food chains are utilized as a marketing

channel the wholesalers as well as the brokers are usually eliminated from the transaction; purchases are made directly from the canners. In some instances the chains contract to take the entire pack and pay the usual marketing expenses. Goods are sent directly to the chain store warehouse.

The growth of chain stores in recent years has created a new type of outlet for the canneries. For the selling agents, however, the chains provide a new source of competition in the supplying of a more direct marketing channel. Indeed, the direct buying of chains is under fire on grounds of price discrimination, as will be noted later.

MARKET PRACTICES

It is evident from the foregoing that there is a wide diversity in the distribution channels through which salmon finds its way from the cannery to the consumer. A similar diversity is found in the types of business practices which govern the relationship between packers and agents and between buyers and sellers in the market and in competitive practices.

Agency Contracts

Concerning the types of contracts between sales agencies and packers in domestic and foreign marketing, DeLoach writes as follows:¹⁶

"There is a complete lack of uniformity in the contractual relations between selling agents and their principals relating to sales promotion policy, methods of paying commission, and the extent of the authority of the agent to act for his principal in contracts with buyers . . . the selling agent acts completely for his principal in the sales transaction by concluding all contracts with the buyer, receiving payment for the merchandise, and remitting the money to the packer or principal after deducting his commission; or, the selling agent acts in a limited capacity as sales representative only, the financial transactions being conducted between the seller and buyer."

The arrangement between the selling agents, or factors, and the packers, with respect to the 5 per cent commission allowed, is generally regarded as being uniform throughout the trade. Where

¹⁶ DeLoach, cited, p. 74.

the primary agent had established a relationship with a secondary broker in a secondary market, the division of this commission of 5 per cent equally between the primary and the secondary agency was recognized in the N.R.A. Code for the industry in 1934. Competitive practices, it is said, make a material difference at times in the actual amounts received.

Until recently another competitive practice prevailed in the form of attempts by independents and even large packers to sell direct to wholesalers. The commission saved was often split or passed on to the wholesaler who used the gain as the basis for price-cutting against his competitors. This practice, however, is now outlawed by the Robinson-Patman Act of 1936,¹⁷ and is no longer followed.

Sales Contracts

The salmon market is essentially a "spot" market although contracts for future shipments are the common practice. No futures are sold. Sales are made on the Seattle, Bellingham or San Francisco price. Typically they are strictly on cash terms. The buyer receives a 1.5 per cent discount for cash payment and also a 0.25 per cent discount against normal spoilage claims. The buyer also receives various forms of guarantees in the sales contract. The price quoted in the contract may be guaranteed against the general opening price, or against that of some particular seller. The guarantee may be also against a decrease in the price of the broker handling the sale over a stipulated period of time.

Guarantees are often made against opening prices. Primary dealers frequently sell before the announcement of the opening price with a guarantee to refund differences between that and the contract price. In some instances a guarantee is made against a decline in price, and shipments are held without cost to the buyer well beyond the opening selling season, even to December 31st of the pack year, as a good will gesture and price concession. In the past year (1938) refunds amounted to hundreds of thousands of dollars.

While the majority of the brokers sell for cash, f.o.b. Seattle or San Francisco, rail or steamship delivery, on direct orders, sometimes selling is done on a consignment basis by the packers.

¹⁷ See below, p. 142, footnote 23.

By consigning car lots to their own account for holding in eastern terminals and for later sale to brokers, packers are in a position to make quicker deliveries, and may sell in smaller lots with less freight and storage costs to wholesalers in distant markets than the orthodox dealer. The practice is considered price cutting and is not sanctioned by the trade in general.

Price Leadership

The functioning of marketing machinery may be characterized, first, with reference to red salmon. This product caters to the high-price trade, being more expensive than pinks or chums. The large Bristol Bay packers hold the major part of the business, which is considered the most profitable section of the industry. As noted earlier, operations in Bristol Bay require high fixed investments and operations are more costly. It is the big concerns, able to put up the necessary capital, which succeed. The smaller firm is at a disadvantage in providing the usual transport equipment which Bristol Bay requires and which is idle much of the year, and in meeting the higher construction costs and labor costs so characteristic of this remote region. These factors influence the supply and price of red salmon.

At the close of the canning season one or more of the leading producers announce the opening price on reds. This quotation may or may not be followed by other concerns depending upon circumstances. These prices often are made simultaneously in several markets. For example, Libby, McNeill, & Libby will make quotations in Seattle, San Francisco and Chicago on the same day. Other packers may follow this price or set their own prices a short time after. Often there is no single market price but several, not only on reds but also on the cheaper grades as well. Through their own marketing organizations these large sellers carry out the orderly distribution of the output during the selling season. Packs of independent concerns in the various districts of Alaska and the states are sometimes purchased by them as "fill-ins" to supply the trade, or on occasion to support the price of reds in the primary markets.¹⁸ There is a general tendency on the part of the independents to follow the large

¹⁸ In 1936, as stated on p. 132, the big eight sold approximately 750,000 cases for the smaller packers.

concerns on the opening price and thus stabilize the market. When salmon prices are strong, very little price cutting is done, but under conditions of falling markets some selling occurs at prices below those quoted by the leaders.¹⁹

In naming the price of the cheaper species the lead in establishing the opening price is also undertaken by the large producers of these species. The market frequently is sustained by these producers by the same practice of purchasing outright the stocks of the smaller and weaker independents, and of handling other packs on a brokerage basis. As indicated elsewhere, the large packer frequently finances the independent concern in return for the privilege of selling his pack. Competition in the cheaper lines, where sellers are more numerous, is more pronounced than in the red brands. Of the total pack of Alaska, Washington and Oregon, 29.3 per cent consists of high-priced reds.²⁰ More companies operate in the pink and chum field, and many of them are relatively small and inadequately financed. The market for the cheaper species is less well developed; advertising has not been as well sustained as in the case of the reds.

Competitive Practices

Dominance in the primary markets has tended to shift between the packer brokers and the large brokers in recent years. They compete in fixing and announcing the opening prices of various species. Differences in financial position and in opinion as to the most profitable price policy cause a breaking away at times from the opening price on the part of major packers, brokers and independents. In this connection, it is not to be assumed from what has been said that control over the price of reds, pinks and chums lies exclusively in the hands of the largest packers. As observed in Chapter VII, there are a number of sizable independent packers well established in terms of production costs and financial status who are in a position to challenge any undue raising of quotations by the largest concerns. Indeed, it is the general opinion in the trade that these strategically situated and

¹⁹ Interview with leading brokers, packers and independent operators.

²⁰ *Pacific Fisherman*, 1938 Yearbook Number, p. 67. In 1937 2,160,000 cases of reds and 5,358,000 cases of pinks, chums, silvers and kings were packed in the United States and Alaska.

efficiently operated firms actually hold the balance of power in the determination of salmon prices.

There is a tendency for the packer to assume a more aggressive attitude than the broker in selling policy, owing to his heavier investment in plants and inventories and his constant search for new and independent outlets for his product. Being a two-edged sword, price cutting has rarely been employed in the attempt to drive the small packers from the field in order to clear the path for the dominance of the big concern.

A canvass of the leading independent producers owning canneries in Alaska, Washington and Oregon, conducted by one of the authors, shows that the use of dummy corporations for fighting purposes is a very rare phenomenon in the industry. Apparently the implicit policy of the large packers is to allow the independent to operate unmolested in the field for two reasons. The first reason is a business consideration—namely, that of passing the financial risk of packing the marginal output to the smaller firm. His pack may aid in furnishing reserves, and when sold earns a commission to the large seller. The second consideration, a politically expedient one, is "to keep the small operator in the field as a buffer between scheming politicians and the larger packers."²¹

For the industry as a whole a further check on price wars in the past is to be found in a characteristically high ratio of direct costs to total costs of production. The ratio in salmon canning is higher than in many manufacturing industries. Not only are labor and current supplies important items of expense, but also much of the canning machinery and equipment is often rented from leading can companies in accordance with old, established custom. The overhead costs of the cannery operator are thus converted in large part into "out-of-pocket" expense, which may be readily computed. Direct costs being so important, the salmon industry is relatively sensitive to price variations over a period of time, for operators can more easily adjust output the more their expenses vary with the size of the pack.²² Moreover, much

²¹ Interview with packers and sales agents.

²² This refers primarily to year-to-year variations in prices and output. As shown in Chapter IX, however, the output of canned salmon was well maintained through the depression despite drastic price declines. Moreover, within any particular

of the variable cost is met in practice by short-term advances from brokers, packers and bankers who stand ready to take over the pack on short notice if occasion demands. While sporadic price cutting is commonplace, it is short-lived.

It is alleged in certain quarters that chain store distribution has been a demoralizing influence in the industry. The reason cited is the policy of the chains in buying directly from the canneries, formerly receiving special (in most cases secret) discounts for volume purchases, with allowances for advertising, labelling, etc., and at the same time practically eliminating the sales agents as representatives of the packers.²³ By those adversely affected unfair competition is charged against the packers who deal directly with chain stores and grant special discounts. It has been impossible in our study, however, to investigate the extent to which there exists price discrimination, or the absorption of freight by shippers, or special delivered prices or divergent "mill-net" prices in this widespread salmon market, which includes as many as 2,000 field brokers.

Advertising

Another phase of competitive practice is, of course, the advertising of branded products, which is carried on extensively. Hundreds of different brands are used by the packers, the brokers, and even certain wholesalers to enlarge sales of individual packs and to build good will. As usual, much of this advertising is merely competitive within the industry; like competitive armament it tends to cancel out. Some stratification in price exists in isolated markets for some branded lines. For instance, a higher price (five cents per dozen in some cases) is received for certain identified

season, a considerable portion of direct expenses takes on the character of overhead, owing to the necessity of making large cash outlays before production actually begins. After traps have been driven, and crews and supplies assembled, additional "out-of-pocket" expenses are low. This puts a premium on a large pack. Since the independent trap owner or purse seiner is likely to work his equipment to the limit, these characteristics of fishing and canning make for a maximum pack, once the season has started. In dull seasons, of course, marginal canneries may close down.

²³ Interview with packers and sales agents. At the present time several cases are pending under the Robinson-Patman Act of 1936 only one of which has been settled. Until these are finally adjudicated the full effect of the law on these various sales practices in the salmon trade cannot be stated with certainty. Considerable opinion supports the view that the splitting of commissions in favor of a sales agent, not based on actual differences in costs, violates the law and can no longer be practiced.

lines of reds and pinks. The advertising costs assessed to those brands are passed on to the consumer who is either unaware of the premium he is paying or is willing to pay extra for the highly advertised quality of the product. This practice is not to be confused with instances of artificial classification of demand covering the same quality of product. The latter condition is not known to prevail in the salmon markets.

Aside from the cancelling effect noted above, competitive advertising also serves to bring the product as a whole to the attention of the buying public. Salmon stands in a direct competitive relationship with numerous foodstuffs—especially the cheaper meats, alternative fish products, etc. This competitive position has induced the salmon industry to attempt to expand and stabilize its market through the medium of general advertising, national in scope. Such advertising is conducted on a cooperative basis, with a tax of five cents per case to defray the cost. Companies selling 92 per cent of the total salmon pack in 1937 were parties to the agreement which was extended through the 1938 selling season. The media used consist mainly of magazines with a national circulation, although there is also resort to newspaper, radio and billboard advertising. No individual seller is featured, the appeal being of a general nature. The importance of expanding the market through advertising was emphasized at the end of 1937 when the carry-over of canned salmon was the largest on record. This situation led the industry to double its appropriation for cooperative advertising in the 1938-39 season.

CANNED SALMON AND THE CONSUMER

Methods of marketing, questions of price and advertising campaigns are all important elements in the distribution of canned salmon. The deciding factor, however, is the ultimate one—the consumer. Salmon is a consumption good, a food resource. The conservation of the fish and the processes whereby the product is made available for consumption derive importance in the last analysis from the contribution which salmon makes to the food supply of an individual country and of the world. That is their *raison d'être*. The food content determines the real value of this natural resource, and accordingly it is this which is of major interest to the consumer.

Chemical studies²⁴ of canned salmon indicate that it is particularly valuable as a protein food. It contains more of this tissue-building substance than many other protein foods commanding higher prices. Moreover, there is little variation in the protein content of the various salmon species so that the lower-priced pinks and chums can be used effectively as a source of supply. Salmon also contains other dietetic necessities in greater quantity than do various other protein foods. For example, it is a valuable source of Vitamin D, and provides a certain amount of Vitamins A and G. It is likewise a good source of iodine, calcium and phosphorus, and provides smaller quantities of other important minerals. In fat content it does not rank high as compared with the main fat foods, but it is better than, say, lean meat, although there is considerable variation in the fat content of the different salmon species. Salmon, then, can be considered as an important food in view of its protein, vitamin and mineral constituents, and as such is of considerable value to the consumer.

Of obvious importance in determining the value of canned salmon as an article of diet is the quality of the product as it reaches the market. Like all other fish salmon spoil rather quickly after being caught and become unfit for food unless properly handled. As a result there is inherent in the salmon industry the problem of adequate safeguards for the consumer such as the unsupervised and uncoordinated efforts of individual canners will not necessarily provide for the pack as a whole. The phrase "unfit for food" is somewhat elastic, to be sure, as some foods which have undergone extensive fermentation or decomposition are considered excellent while others which have changed only slightly from the natural state are rated as unfit. Nevertheless, standards for fitness become increasingly strict as man becomes more discriminating in his tastes: a food in a state of staleness which our forefathers would

²⁴ Hugo W. Nilson and E. J. Coulson, *The Mineral Content of the Edible Portions of Some American Fishery Products*, U. S. Dept. of Commerce, Bureau of Fisheries, Investigation Report no. 41, vol. 2 (Washington, 1939); J. R. Manning, *Fish and Shellfish for Food*, U. S. Dept. of Commerce, Bureau of Fisheries, spec. memo. 2256-B (mimeographed), (Washington); C. D. Tolle and E. M. Nelson, "Salmon Oil and Canned Salmon as Sources of Vitamins A and D," *Industrial and Engineering Chemistry*, Sept. 1931, p. 1066; O. E. Shostrom, R. W. Clough and E. D. Clark, "A Chemical Study of Canned Salmon," *Industrial and Engineering Chemistry*, Mar. 1924, p. 283; Douglas G. McPhee, *Canned Salmon and the American Consumer* (San Francisco, undated); Isabel N. Young, *The Story of Salmon* (American Can Company, 1934).

have eaten with complacency, or even approval, is now almost certain to be rejected as unfit.

At the same time has come a recognition of the necessity of government supervision to maintain such standards in the interest of the consumer. As regards food and drugs a measure of government protection strengthened and enlarged at intervals has been in force in the United States for more than 30 years. In the salmon industry in particular both government regulation and the efforts of the canners have operated towards raising the quality of the canned salmon which reaches the ultimate consumer. A brief survey of these measures is accordingly appropriate at this point.

Federal Laws

In an attempt to protect the fish-consuming public, Congress decreed in 1906²⁵ that Alaska salmon must be preserved not more than 48 hours after being killed if it is to be sold as food for human consumption. This measure was undoubtedly a move in the right direction, although it took into consideration only the time factor. It did not recognize the fact that temperature, rough handling, pressure, improper storage, etc., may accelerate the progress of decomposition and fish may become unfit for canning in much less than 48 hours. Nevertheless, it was valuable as calling attention to the necessity of reducing delay in getting the fish to the canneries, and the provision is still in force today.

The packer, however, is sometimes placed in a quandary due to another section of the same Act. In the interests of conservation this declares it unlawful "wantonly to waste or destroy salmon . . . taken or caught in the waters of Alaska." It is clearly intended to prevent the catch of more fish than can be handled by a cannery. However, it sometimes places a difficult question before a packer who through some contingency has raw fish on hand which were caught more than 48 hours earlier or which have become decomposed in a shorter period. Reduction of the stale fish to meal and oil is one solution for this difficulty, but the dispersion of the Alaskan industry and the high cost of reduction plants limits the use of this procedure. When the quality of the salmon is dubious, it is considered advisable to discard the

²⁵ *An Act for the Protection and Regulation of the Fisheries of Alaska*, approved June 26, 1906, 34 U. S. Stat. at L., p. 478.

fish and take a chance on being able to convince the Bureau of Fisheries that such action is necessary. When this is not done, either through error of judgment or carelessness of operation, the canned product runs the risk of falling below the standard prescribed by the Federal government.

Canned salmon, like all other foods entering interstate commerce, became subject to Federal regulation under the Federal Food and Drugs Act of 1906,²⁶ now superseded by the Federal Food, Drug and Cosmetic Act of 1938.²⁷ All of the pack shipped from Alaska to the states is in interstate commerce and most of the pack of Washington and Oregon is likewise sold in other states. Consequently the bulk of the American canned salmon has had to conform to the standards laid down in these laws as regards adulteration and misbranding. Under the provisions of the law, selected samples of canned salmon are officially inspected, seizures resulting if the goods are found not to comply with its terms. In addition criminal charges may be filed against the shipper of the goods seized.

Under the terms of the 1906 and 1938 laws food is considered adulterated on various counts. Most important for the canned salmon industry is the ban on food "if it consist in whole or part of a filthy, decomposed, or putrid animal . . . substance." While the law is essentially a negative one defining certain qualities which food in interstate commerce must not possess, it nevertheless sets a certain minimum standard of health and decency. Little has been done by legislation to determine more positive standards of quality. The McNary-Mapes Amendment of the 1906 Act (1930)²⁸ authorized the Secretary of Agriculture "to determine, establish and promulgate . . . a reasonable standard of quality, condition and/or fill" for each class of canned food, and any food falling below this standard was to be so designated. To date no such standard has been determined for canned salmon except

²⁶ *The Federal Food and Drugs Act*, approved June 30, 1906, amended Aug. 23, 1912, Mar. 3, 1913, Mar. 4, 1913, July 24, 1919, Jan. 18, 1927, July 8, 1930 and Aug. 27, 1935, U. S. C., 1934 ed., title 21, secs. 1-15.

²⁷ *The Federal Food, Drug and Cosmetic Act*, approved June 25, 1938, 52 U. S. Stat. at L., p. 1040. The provisions of this law as regards food did not go into effect until June, 1939.

²⁸ *Amendment of the Federal Food and Drugs Act of 1906*, approved July 8, 1930, 46 U. S. Stat. at L., p. 1019.

as regards the fill of the can.²⁹ The 1938 Act extended the provisions of this amendment to all foods, and expanded it to cover standards of identity as well, but the establishment by the Secretary of Agriculture of a standard of quality is still permissive and not mandatory.

The provisions of the 1906 Act regarding "misbranding" were also largely negative. They forbade any false or misleading statement on the package or label regarding the article of food or its ingredients, but did not lay down requirements concerning information which should be given except as regards quantity. The Federal Food, Drug and Cosmetic Act of 1938, however, establishes certain other requirements as to what must be put on the package or label and wrapper. Food must ordinarily be identified by its common name, and so must additional ingredients. This may possibly be interpreted by the courts as requiring a statement on salmon cans of the species packed—chinook, sockeye, etc.—which was not required under the 1906 law. Not only the quantity of food but the name and place of business of the manufacturer, packer or distributor as well must also be clearly stated on each package or container. Under the new law the penalties for violation are substantially increased.

Summarizing the provisions of the present Federal law as regards salmon, the consumer is given protection against salmon products which are unfit for food and against false or misleading statements regarding such products. He must also be provided with certain information as to the nature of the product on the market and the amount in the container. It is also possible that a certain standard of quality will at some time be set for canned salmon with the requirement that the consumer be informed if the product falls below this standard. There are, however, no legal provisions which require a quality grading to guide the consumer public in its purchases. In the case of canned salmon such grading would of necessity be a most complicated affair, as the grades would need to be established for each individual species.

²⁹ The 1930 Act provided that the standard might be set only as regards each generic class of canned food, not for a grade, variety or species. In the case of canned salmon this would have meant one standard for all five species, a procedure which would have done little to provide more positive standards of quality. The 1938 Act, however, has no such limitation.

Federal Inspection

In administering the present Federal law, the Food and Drug authorities have worked on the principle of acquiring as great a familiarity as possible with the canning operations of the industry in order to increase the efficiency of the subsequent inspection of the pack by sampling. During the canning season the Federal inspectors visit the canneries both in the states and in Alaska. In the latter region the difficulties of transportation have considerably hampered inspection in the past, but recently seaplanes have been used to good effect. The inspection of the Alaska pack by sampling is carried on at the Pacific coast ports where the salmon is unloaded. Inspection of the Washington and Oregon packs is usually performed at the factory. Intrastate shipments of canned salmon are under the surveillance of the individual state authorities and must comply with the provisions of the various state laws, but the proportion of the total American pack consumed within the state where it is produced is extremely small, and hence the problem is chiefly a Federal one.

For certain other food products another method of Federal supervision to guarantee compliance with the law has been adopted. The meat industry, for example, operates under a type of Federal inspection which checks the quality of the product at the processing plant at Federal expense before it passes into interstate commerce. In 1934 the Federal Food and Drugs Act was amended to provide that any packer of sea food might apply for Federal inspectors "to examine and inspect such food and the production, packing, and labelling thereof."³⁰ Costs were to be borne by the packer. Food which after such inspection was found to comply with the provisions of the Act could be so marked: "Packed under the supervision of U. S. D. A." This control during the process of production is considered by pure food authorities as superior to any sampling after the product is in finished form. To date, however, the shrimp industry is the only one which has instituted this arrangement. Congress now appro-

³⁰ *Amendment of the Federal Food and Drugs Act of 1906*, approved June 22, 1934. This Amendment placed all the costs of the inspection on the industry. Under a subsequent amendment not all the costs were to fall on the packers. The salaries of a number of inspectors for this special inspection service were covered by Congressional appropriation. This sea-food amendment is still in force under the terms of the Federal Food, Drug and Cosmetic Act of 1938.

priates a small sum of money each year to assist in the defrayment of expenses incurred by such inspection, but a similar service has not been requested by the salmon packers or any other sea food packing industry because of the belief that the costs which would devolve upon the industry would outweigh the resultant benefits.

Record of Canned Salmon under the Food and Drug Act

The results of Federal inspection of canned salmon at the present time show a distinct improvement over earlier days in the industry. The period following the World War was marked by many infringements of the law and by court contests between the packers and the Federal authorities. In recent years there has been much less trouble, even though the standards set for canned salmon have been raised since 1925 so that cans may be subject to seizure today which might have passed inspection in 1920 when the general level of quality was low.

The most important element in conditioning the quality of the pack is the speed with which the salmon is transferred to cans after it is caught. Numerous factors may cause delay such as the breakdown of a loaded cannery tender, or bad weather delaying its arrival at the cannery, or a breakdown of the canning machinery. A marked rise in weather temperature may also accelerate the rate of spoilage. Again, a boatload of fish may be delivered to a cannery in which a spoiled catch of salmon is mixed with a fresh catch. All these factors call for the exercise of care and judgment by the cannery superintendent. Improvements in the speed of machinery, the frequent use of cleansing agents and germicides, a keener appreciation of the cause and signs of spoilage have contributed to the production in recent years of a greatly improved pack of canned salmon.

To quote from the 1937 report of the Chief of the Food and Drug Administration,³¹ "at the present time sufficient care is exercised in the average cannery, as the result of seizures and prosecutions, to eliminate all but occasional decomposed fish from the pack." As will be shown below, the industry itself has also been active in improving the pack. The notices of judgment published by the Department of Agriculture report the Federal

³¹ U. S. Dept. of Agriculture, *Report of the Chief of the Food and Drug Administration* (annual), 1937 (Washington, 1937), p. 10.

seizures. It should be noted, however, that these are apt to be misleading as they record the total number of cases of the lot seized, not the number of objectionable cans, which may constitute a very small percentage of the total.

A factor of considerable importance in the quality of the pack is the rate of pressure under which the canneries work when the run of fish is under way. Nonetheless a year of heavy runs need not necessarily produce a poor pack. The 1935 report of the Chief of the Food and Drug Administration stated that "last year's pack was one of the largest ever produced and the inspection indicates that it was one of the best."³² Two years later when there was a record pack, however, 94 consignments were seized. On the other hand a lean year may result in a poor pack as longer hauls of the fish are made and quality may be sacrificed to obtain quantity. The season of 1935, for example, which had a smaller pack than the preceding year, witnessed the seizure of 145 consignments. The last two years present a very good record. There were no seizures of the 1937 pack recorded and while there were some for that of 1938, they were few in number and concentrated in the output of a few canners. It is thought that possibly one answer to the problem of a good pack is stability of supply, difficult as this is to achieve.

Inspection by the Industry

Contributing to the improvement of the salmon pack in recent years have been the efforts of the industry itself. An inspection of the canned product for the canners themselves is maintained by the industry through the Northwest Branch of the National Canners Association, members paying for the service on the basis of their total pack of the preceding year. The rate varies slightly from year to year, ranging from one half to two thirds cent per case. The method of inspection is the result of considerable research and inspection of several million cans extending over a period of nearly 19 years.

The method was first applied on an industry-wide scale in 1933. Since then the industry inspection has been extended until in 1938 it covered 88 per cent of the total American pack. The officials of the Association follow a sampling process on each code

³² *Ibid.*, 1935, p. 10.

lot which they endeavor to make as representative as possible. Each can sampled is tested for weight, vacuum and other factors dependent upon workmanship, such as filling, salting, cleaning and evidence of rough handling. The quality of the fish is noted from color, amount of free oil and presence or absence of the so-called "watermarking" which is a sign of approaching maturity. The condition of the fish when packed is judged from the odor and other signs of freshness or lack of it. A written report is rendered to the packer on each parcel examined and at the end of the season a summarized report of his entire pack is made which he can compare with a tabulation covering all the parcels inspected for the industry. In this way the packer can compare his current pack with that of previous years and with that of the industry as a whole.

Parcels which are found to be seriously deficient in some one or more respects may need to be given special consideration or treatment, and recommendations concerning them are made to the packer. This is true, for example, of parcels showing any appreciable percentage of short-weight cans—a rare occurrence. Parcels having cans with little or no vacuum are brought to the attention of the packer, with the advice that they not be shipped to a warm climate or high altitude since unmerchantable puffed or swelled cans would be likely to result from physical causes alone. Parcels having cans judged to be seriously lacking in freshness are recommended for the "reconditioner" where each can is tested by odor and all bad ones segregated for destruction while the good cans are resealed and recooked. Such cans contain good food but command a somewhat lower price.

The packers are urged to examine cans from each day's pack in the cannery, and many of them follow this practice. By doing this mistakes may be detected and corrected before any considerable part of the pack has been affected. At one time the Association maintained cannery inspection by means of some 30 travelling inspectors. It was difficult, however, to obtain well qualified men for this very seasonal and highly technical work and the practice was given up. Brokers and buyers also inspect samples from various parcels, although increasing reliance is being placed upon the National Canners Association reports which have been sent to the packers.

An outgrowth of the industry's inspection has been a yearly "cutting" of the pack. Samples aggregating several hundred cans are drawn at random from all canners' packs and given a secret code. They are carefully rated by about 100 judges selected from all branches of the industry. Each packer is then given the key to the codes on his cans so that he may learn how they have compared with others examined. This cutting being well attended has served as an educational process.

The yearly reports of the industry's inspection point out the improvements which have been made and the inadequacies which must still be met. The 1938 report indicated that the general quality had been good and that most of the unsatisfactory salmon found had been produced by only a few packers. In commenting on the Federal seizures, it was pointed out that the few made could have been avoided if the packers concerned had reconditioned the code-lots as recommended by the industry's inspection service.

As regards grading of canned salmon it may be said that the industry as a whole considers it desirable to have the species of salmon indicated on the can. Packers, however, cannot necessarily control the labels applied by brokers or distributors. The N.R.A. code for the industry provided for species labelling, and although this code lapsed in 1935 such labelling is applied to a considerable portion of the pack. The packers have also undertaken some quality grading of fish, particularly of the large chinook which is adapted to individual grading because it is largely packed by hand.

Apart from variations in the quality of canned salmon which result from the nature of fishing and canning operations, quality depends to some extent on biological variation in the yearly runs. Such variations are obviously beyond the control of the packers. As regards the controllable factors the industry and the Federal authorities concur in the opinion that the general standard of canned salmon now produced is on a higher level than in earlier years, and that the putting up of an unsatisfactory product is confined to a minority of the industry. The responsibility for this improvement may be attributable both to the Federal government and the industry itself, each of them responding to the growing insistence of consumers for more adequate guarantees of quality.

IX

SALMON PRICES

IN ANY consideration of modern industry the behavior of prices is an essential element. Market prices reflect the convergence of the forces of demand and supply—of the numerous factors both within and without the industry which determine its character and development. A complete analysis of the salmon industry, therefore, must proceed from a description of the conditions of the production and marketing system—the subject matter of the foregoing chapters—to a scrutiny of its results in terms of prices, profits, costs and output.

An intensive study along such lines is beyond the bounds of this volume, as the authors have been careful to point out. What has been attempted, however, is a broad picture of the structure of the industry, its problems and within certain limits its practices. In continuing the exposition this chapter presents certain data on the structure of salmon prices, their behavior in recent years, and pertinent comparisons with the prices of other commodities. These data are offered with due regard for the limitations upon any conclusions which may be drawn without more intensive exploration of the problem. They are in the form of a series of charts, accompanied by brief explanatory notes.¹

Course of Wholesale Prices (1921-38)

Fig. 11 portrays the broad course of salmon prices from the early post-war slump to the latest period for which quotations are available. The species chosen—Alaska reds, pinks, chums—represent high, medium and low qualities of fish respectively. Alaska reds and pinks are two of the most popular species in the high and medium price ranges. Chums are less favored but at their lower price level they likewise find a large market. These three, then, are representative of canned salmon as a whole. The

¹ Extensive price studies of the industry are being made by one of the authors (H. E. G.) of which the material in this chapter represents certain preliminary findings.

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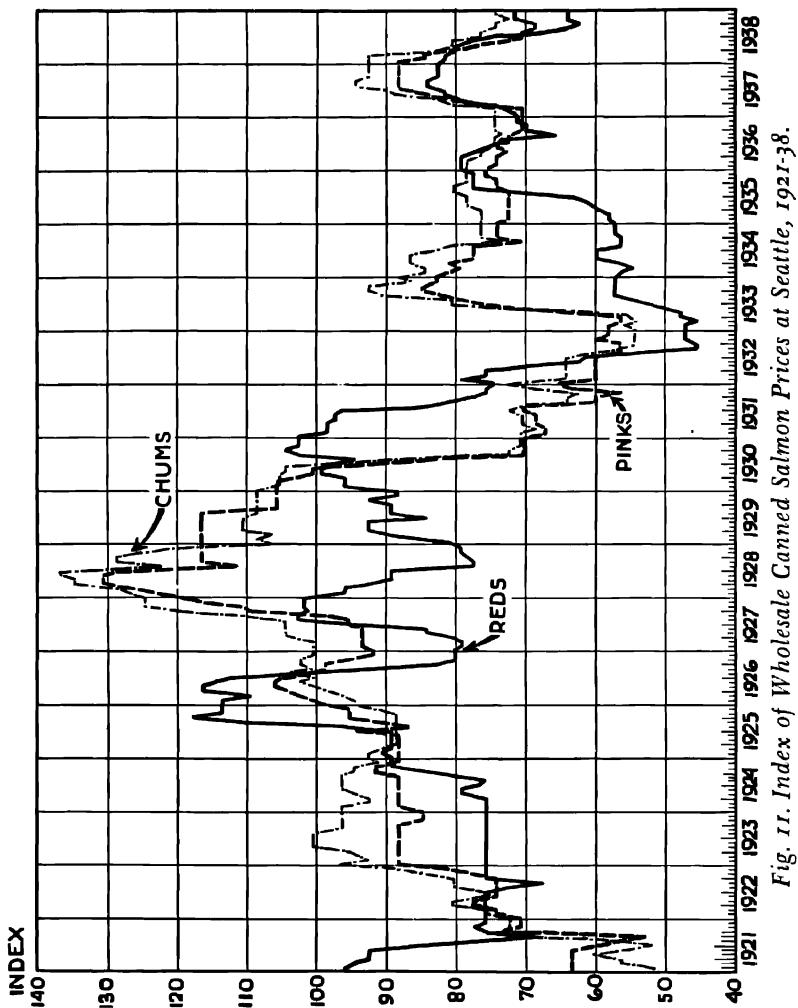


Fig. 11. Index of Wholesale Canned Salmon Prices at Seattle, 1921-38.
(1926 = 100)

Source: Data from *Pacific Fisherman*, Yearbook Numbers.

prices used are Seattle wholesale, and the indices are calculated on the monthly average price in 1926 as a base.

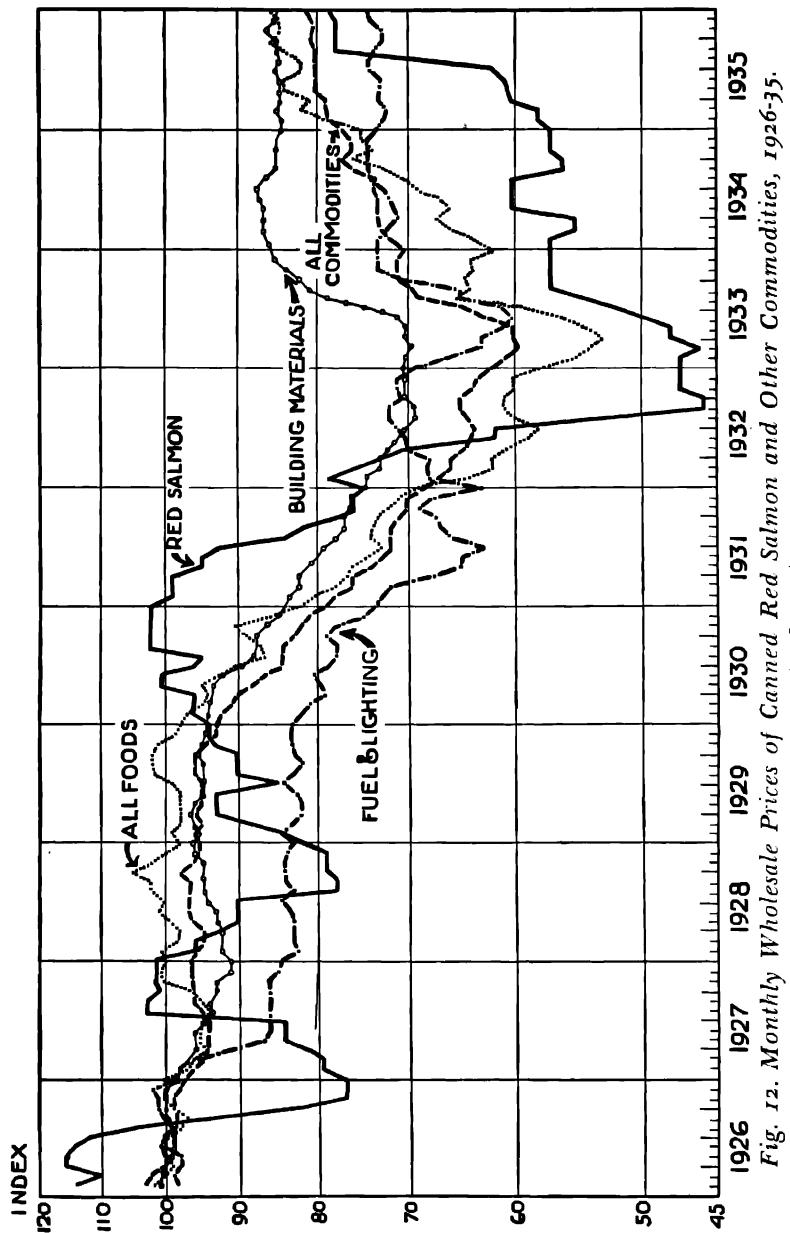
The broad price movement over the 17-year period is roughly the same for all three species. In each case prices recovered from post-war depression lows to a peak in the years 1925-28. With the advent of the recent world depression came a collapse of salmon prices. By 1932 all three species had dropped more than 40 per cent from their 1926 level and more than 50 per cent from their pre-depression peak.

Within this broad movement there was considerable year-to-year divergence among the individual species, occasioned by variations in the pack and the trend of the market. Red salmon, for example, did not participate in the upswing from 1921 in the same degree, and its price movement has run a different year-to-year course during much of the past decade. The precipitate decline occasioned by general depression did not set in until 1931 in the case of reds, due to a short 1930 pack, and the recovery after 1932 followed an altogether different pattern. It was the short pack in Bristol Bay again which occasioned the marked rise in the price of red salmon in 1935. The indices for chums and pinks, on the other hand, move closely together. All three, however, show a high degree of instability, as will be apparent from inspection of the chart.

Comparisons with Other Commodity Prices

This general feature of salmon prices is further emphasized in Fig. 12 which compares the wholesale price behavior of red salmon during the past decade with that of commodities in general, all foods, fuel and lighting and building materials (1926 = 100). In this chart salmon shows the greatest instability of any of the groups. This is not surprising in view of the variation in salmon runs, and in view of the fact that composite index numbers averaging a number of commodities naturally fluctuate less than the index for a particular commodity. Compared with commodity prices in general, salmon prices display a tendency to more abrupt change and to wider swings during the decade. In addition, a definite lag may be noted both in the decline of red salmon prices occasioned by the depression and in the subsequent re-

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Source: Data from United States Bureau of Labor Statistics.

covery. As already observed, red salmon is not representative of pinks and chums in this regard.

It would appear from these data, and also from those of production and carry-over considered elsewhere, that the salmon industry does not vary its output readily in accordance with swings in market demand as affected by the business cycle. It is generally believed that the demand for all grades of salmon is relatively inelastic. This point will be referred to again, but here it may be remarked that these price data suggest a lagging response of production to changes in demand, which occasions rather wide fluctuations in wholesale prices at Seattle.

In its retail market salmon competes strongly with other foods, of course. Its price is influenced not only by the general demand for food and by the available supply but also by its competitive attractions for consumers. Over a period of time the tastes and spending habits of consumers are subject to changes in which price is not the only determining factor, as is evidenced by the long-term growth of the salmon industry. At any particular time, however, the competitive price position of salmon will influence the volume of demand. Accordingly, it is to be expected that the retail price of salmon and other competitive foods will run a course which is broadly parallel, and that the demand for salmon will be influenced by the relative position of its price in this field.

The rough similarity in the trend of red salmon prices relative to those of all foods and of poultry, pork and chuck roast beef, three protein substitutes, is portrayed in Fig. 13, covering most of the period since the World War. There is also considerable divergence, however, in the year-to-year changes of the four indices, and particularly noticeable is the tendency of salmon to deviate from beef prices in a downward direction. While such a divergence undoubtedly affects the demand for salmon and thus reacts upon its price, it is obvious that the price of substitute foods is only one of several factors determining salmon prices. As a matter of fact, a closer correlation appears to exist between the price of red salmon and the annual pack² than between its price and the price of food in general or of these three protein substitutes.

² Other independent studies of meat prices agree with these conclusions.

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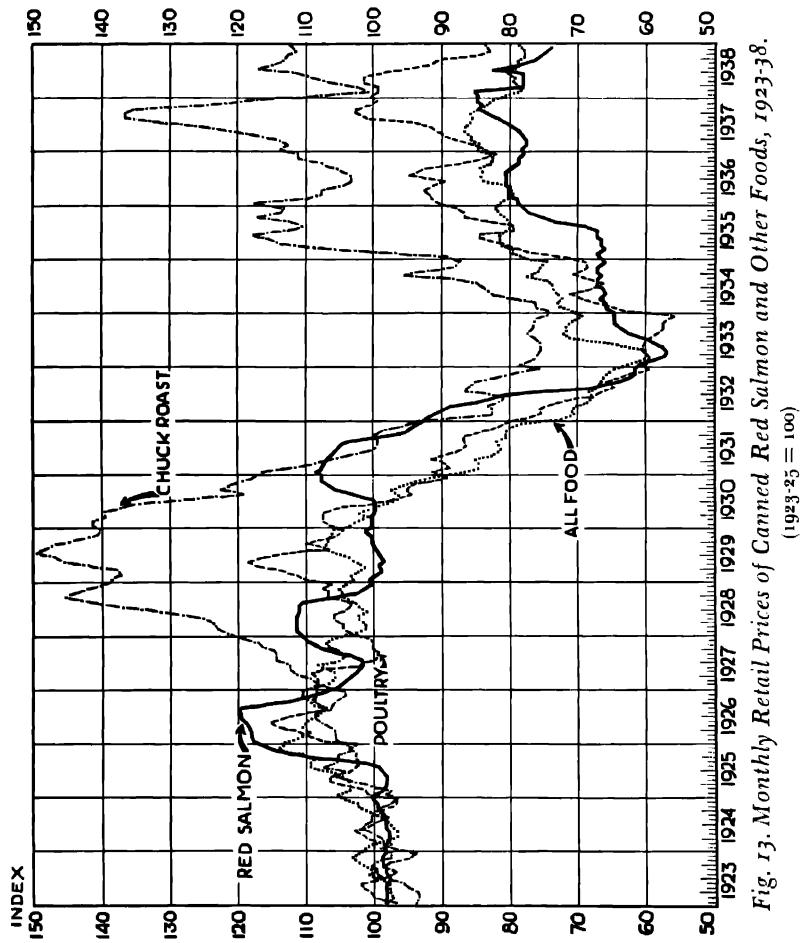


Fig. 13. Monthly Retail Prices of Canned Red Salmon and Other Foods, 1923-38.
(1923-25 = 100)

Source: Data from United States Bureau of Labor Statistics.

Seasonal Variation

The year-to-year instability of salmon prices discussed above, reflecting as it does the variations in market demand and in the size of the pack, is to be contrasted with the seasonal behavior of salmon prices. In the period since 1921 the average seasonal variation, month to month, has been very slight. In other words, when allowance is made for cyclical and secular trends, only to a small extent is there a persistent tendency to seasonal fluctuations within the year. Fig. 14 pictures the typical divergence of monthly

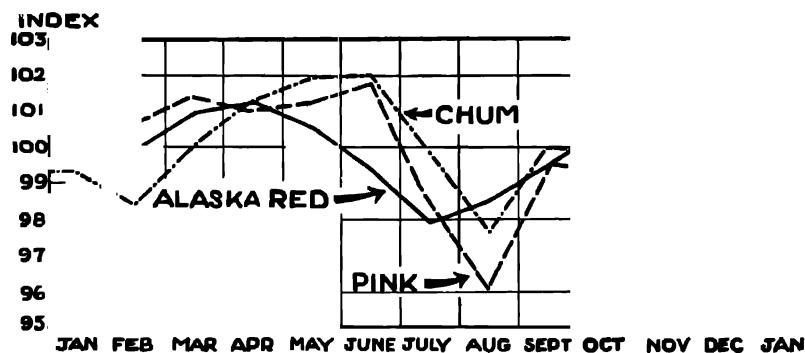


Fig. 14. Adjusted Seasonal Indices of Wholesale Canned Salmon Prices at Seattle.

(Based on percentages of centered 12-month moving averages, July, 1921 to June, 1936; Monthly average of 1926 = 100.)

Source: Data from *Pacific Fisherman*, Yearbook Numbers.

prices from their annual average (12 month moving average). It shows that the average seasonal variation in the price of all three species during the period 1921-36 does not exceed six per cent (96 to 102). The summer season, when the new pack is being put up, normally brings a weakening of prices. This dip in July and August is followed by an upward trend in ensuing months, with a secondary dip in the winter season, sometimes due to tax selling. In view of the highly seasonal character of salmon canning, the slight seasonal variation in prices is testimony to the effectiveness of the industry's marketing organization in the orderly disposal of the pack throughout the year.

Frequency of Price Changes

Further evidence concerning the variability of salmon prices is to be found in a third type of analysis—the frequency of change in monthly quotations in the primary market of Seattle. The procedure adopted was to count the number of months from January, 1920, to December, 1937, in which the monthly price did not vary from that of the month immediately preceding. In a period of 374 months it was found that the price of red salmon remained unchanged in 85 months (23 per cent), pink salmon in 108 months (29 per cent), and chums in 100 months (26 per cent). The longest period of consecutive months during which the price of reds remained constant was 18 months; for pinks it was 10 months, and for chums 6 months. All of these unbroken periods occurred in 1922-23, following the demoralization of the markets in 1921.

Variations in Price and Output

Another approach to an understanding of salmon prices is through a comparison of the year-to-year changes in price and output of salmon with that of other commodity groups. The pattern of supply-price relationships varies widely from industry to industry, of course, and is affected by the nature of demand as well as the extent to which the supply is free from restrictions. The sensitivity of salmon prices can be thrown into broad relief by comparing their behavior with that of a commodity known to have definite earmarks of monopolistic control, and with second, a group of commodities known to possess characteristics found in unfettered markets. For this purpose Figs. 15 and 16 are presented to contrast red salmon prices with monopolized aluminum and general farm products.

Aluminum, of course, is an industrial material, the demand for which fluctuates widely with capital goods activity. Moreover, there is a high degree of monopolistic control over its production, the industry being completely dominated by one firm. During the depression years, with their drastic slump in capital goods production, prices were rather rigidly maintained, dropping only 18.6 points (1926 = 100) from 1929 to 1933. Since then they have risen slightly. Production, on the other hand, dropped by more than two thirds from the peak in 1930 to the low point in 1934.

Subsequently it participated in the upswing of the recovery years.

American agriculture, by contrast, operated largely under the dispensation of competition until the advent of the Roosevelt administration in 1933. Not only were farm crops produced by thousands of individual producers; they also found their way largely into consumer goods markets—food, clothing, etc.—where

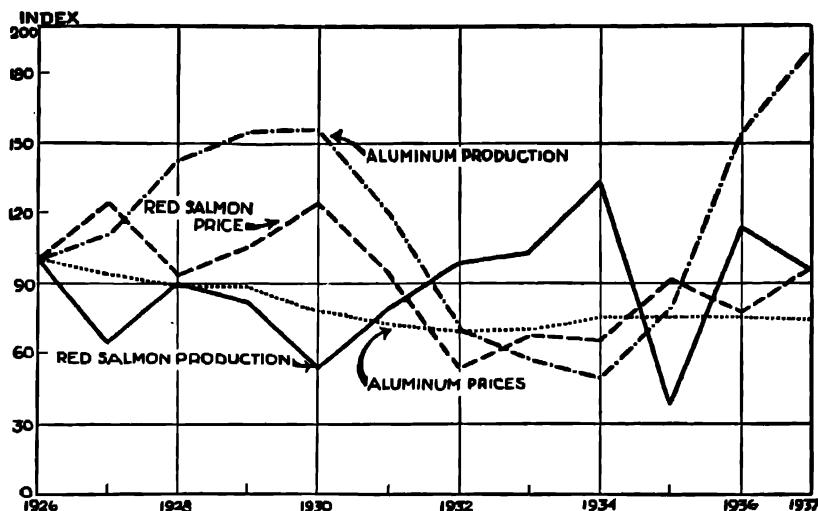


Fig. 15. Price and Production of Canned Red Salmon and Aluminum, 1926-37.
(1926 = 100)

Source: Data from *Pacific Fisherman*, Yearbook Numbers; *Iron Age*; *Metals Yearbook*.

demand is stable relative to that in the capital goods market. Farm output declined but little during depression years, as Fig. 16 reveals. The production index (1926 = 100) actually rose in 1931—chiefly because of a bumper cotton crop—and in 1932 it was 98, only four points below the figure for 1928. Meanwhile farm prices collapsed, reaching a point in 1932 which was well below half their 1928 level. After 1932 farm prices rose and output declined, reflecting the agricultural program of the New Deal as well as general business recovery. Production reached its lowest level in 1935 and has since risen. Without pursuing the matter further, we may note that farm output has varied relatively little

during the past decade, while farm prices have been subject to wide swings. The reverse is true of aluminum.

Red salmon prices and production have followed more nearly the pattern of farm crops than of aluminum, although with greater year-to-year variations in production. The pack of this species, after falling to an early depression low in 1930 (a short red salmon cycle in western and central Alaska), rose progres-

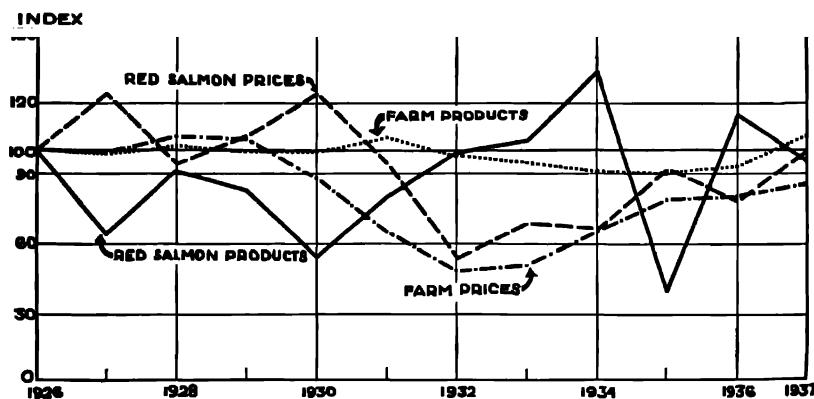


Fig. 16. Price and Production of Canned Red Salmon and Farm Products, 1926-37.
(1926 = 100)

Source: Data from *Pacific Fisherman*, Yearbook Numbers; U. S. Dept. of Commerce, Bureau of the Census, *Statistical Abstract of the United States* (Washington); *Survey of Current Business*.

sively from 81 (1926 = 100) in 1932 to 134 in 1934. In the latter year it was above even the World War level. Prices fell from 94 in 1928 to a low of 54 in 1932, or as much as 40 points in the index. The year-to-year inverse correlation was high³ despite the fact that both price and output showed a certain tendency to decline before 1932 and to rise thereafter.

Pink salmon production suffered a relapse in 1932 to 64 (1926 = 100). From that point it gained progressively until 1936, when the production index mounted to 138. From 1928 to 1932 output dropped only 20 points, while price declined 63 points; in

³ A study of red salmon carry-over, supply and price, the details of which are not given here, shows a coefficient of correlation between output and price of $-.8432$; and $-.8215$ when corrected for the smallness of the sample. No similar correlation is observable in the case of pinks and chums during the decade.

short, the relationship was similar to that of red salmon. Chum output and prices followed the pattern of the pinks fairly closely.

Following the 1932-33 lows, salmon output rose to high levels in the year 1936, representing an all-time high in the total pack. Competition apparently brought about maximum yield of the raw product within the limits of conservation regulation. The supply of all species progressively increased from the low point of the depression (1932-33) to a high in 1936. The one exception was the short supply of reds in 1935, when the Federal government virtually closed Bristol Bay to fishing in order to protect an extremely small run of fish.

The following table (1926 = 100) summarizes the relationships existing between the changes from 1928 to 1932 in the indices of output and price of aluminum, farm crops and canned salmon:

	Change in Price Index	Change in Output
Aluminum.....	-18.6	-84.0
Farm products.....	-57.7	-4.0
Salmon (reds).....	-40.0	-13.0
Salmon (pinks).....	-63.0	-20.1
Salmon (chums).....	-70.0	-12.1

We may conclude from the above data that the great depression brought a pronounced drop in salmon prices and a relatively slight decline in output. In this regard the behavior of the salmon industry stands in striking contrast to that of the aluminum industry, although in comparison with agriculture a similar fall of prices was associated with a greater reduction of output.

It would be easy, however, to infer too much from these comparisons. A complete understanding of price behavior requires a more thorough analysis of the conditions of demand, supply and industrial organization than is possible here. Unfortunately no studies are available to show adequately the comparative elasticities of demand in these fields, or the extent to which the depression years brought a relative shift of demand schedules (changes in quantities demanded at various prices). The market for aluminum, as noted above, differs greatly from that for canned salmon, for the former is a capital good in substantial degree and is thus subject to wide swings in demand, while the latter is a consumer good, and a food, of relatively stable demand. Moreover, being a cheap meat substitute salmon might be ex-

pected to benefit in some measure from the redirection of consumer spending in the years of falling incomes prior to 1933 and from the rapid rise of meat prices in subsequent years under the influence of drought and of Federal farm policies. Again, the nature of industrial costs is a further difference likely to influence the behavior of prices.

Circumstances such as these undoubtedly have much to do with the above statistical comparisons. It is certain, for example, that the relatively slight decline in salmon output and in sales was due not only to the great reduction in prices accepted by the packers which stimulated sales, but also to a movement in consumer demand much more favorable than that experienced in the aluminum industry during depression years. Durable goods tend to show greater variations in production regardless of price policies. Hence no clear-cut conclusions as to the nature and effects of price policy in the salmon industry are to be derived from these data alone. They do indicate, however, that the salmon industry is not characterized in any great degree by that price rigidity, or "stickiness," which is increasingly to be found in many American industries today.

X

FOREIGN TRADE IN CANNED SALMON

THERE IS little occasion to differentiate the foreign market for salmon from the domestic market in dealing with the production operations of the industry or with much of its machinery of distribution. The product destined for foreign consumption does not differ in character from that purchased by the housewives of Canada and the United States, nor does it pose any special production problems. Here, as elsewhere, however, a special interest attaches to the foreign trade position of the industry because of the questions of national economy involved therein. Accordingly, the present chapter deals briefly with the export market for salmon, and with the position of the industry in regard to competing imports.

CANNED SALMON

Fortunately for the statistician the great bulk of the salmon produced commercially is canned, and in foreign trade the canned product is by far the most important. We shall therefore focus our attention here. Fortunately, too, almost the entire output of canned salmon in the United States and Canada comes from Alaska and the Pacific Northwest. As a result the national trade figures of the two countries may be used to portray the foreign trade position of the Pacific salmon fisheries with almost complete accuracy.

Imports

The first characteristic of the salmon foreign trade of note is that imports offer little competition to domestic production. United States canned salmon imports have always been small, and for the five-year period 1934-38 they amounted to 10,851,859 pounds¹ as compared with 1,832,787,216 pounds² produced within

¹ Data for 1934-37 taken from U. S. Dept. of Commerce, Bureau of Foreign and Domestic Commerce, *Foreign Commerce and Navigation of the United States* (an-

the country. These imports were almost entirely composed of the pink and chum species and came primarily from Canada and Japan. The greater portion was derived from the former country although in 1936 and again in 1938 imports from Japan slightly exceeded those from Canada. In 1937, however, imports from the latter country amounted to 5.4 million pounds. The United States industry is protected by a 25 per cent ad valorem import duty, imposed in 1922. Previously the rate had been 15 per cent.

Canadian canned salmon imports are also small compared with domestic production, amounting to only 245,222 pounds for the five years 1933-37,³ whereas 372,831,608 pounds⁴ were produced within the country during the same period. These imports came principally from Newfoundland and only a very small amount from the United States. However, these are imports for consumption and do not include the canned salmon exported from the United States to Canada which is destined for Europe via Canadian railway and steamship lines. Canadian duties vary from 17.5 per cent ad valorem in the British preferential tariff to 30 per cent in the general tariff. The United States receives the intermediate rate of 27.5 per cent.

Exports

While the canned salmon industry of the Northwest suffers little foreign competition in the domestic market this does not hold true in foreign markets. In this connection it is important to note the proportion of output which has been exported in recent years. During the last decade the combined exports from the fisheries of Alaska, British Columbia, Washington and Oregon have approximated 21 per cent of the pack.⁵ In other words, the

³ Canada, Dominion Bureau of Statistics, External Trade Branch, *Trade of Canada* (annual), 1933-37 (Ottawa).

⁴ *Pacific Fisherman*, 1939 Yearbook, p. 67. Figures converted to pounds at 48 pounds a case.

⁵ *Pacific Fisherman*, 1939 Yearbook, p. 69. Figures converted to pounds at 48 pounds a case.

⁶ This includes United States exports to Canada and vice versa. In both cases these are small, however, and as already stated the greater part of the American shipments to Canada are really destined for Europe.

bulk of the product goes to American and Canadian consumers, overseas markets accounting for about one fifth of the total. (Shipments from Canada to the United States, and vice versa, are not large enough substantially to affect this conclusion.)

There is, however, a striking difference between Canada and the United States in regard to domestic consumption. As might be anticipated, British Columbia packers depend on overseas trade to a far greater degree than their American competitors. During the past decade about 69 per cent of the Canadian pack has been exported, while the corresponding figure for the American industry is around 11 per cent. Canada with a population of only 10.4 millions offers no market to compare with the American market and her salmon packers have therefore been forced to seek outlets abroad. Export shipments from Canada even exceed those from the United States (see below), although the British Columbia pack is only about one fifth that of Alaska, Washington and Oregon.

In neither case, however, has there been a development of canned salmon export trade commensurate with the growth of production. In the case of the United States, indeed, the volume of salmon exports has been slightly lower in the last decade than it was in the first 10 years of this century, whereas production, as has been seen in Chapter III, has shown enormous increase. Canadian exports have, on the other hand, lagged much less behind production. They have increased over the same period by 78 per cent as compared with a production increase of 135 per cent.

In the case of both countries, the World War with its world-wide shortage of food brought an export boom, as the food industries of the United States and Canada were enlisted in the cause of the Allies. The export records of the United States during the war and early post-war boom were followed by a drastic slump, however, which in the case of the salmon industry extended through the 'twenties. Again with the depression of 1929-32 salmon exports turned sharply downward in the face of declining consumer incomes and mounting tariff and quota restrictions. Since 1934 they have regained their pre-depression level, but the long-term prospects of continued expansion can hardly be said to be favorable so long as the world-wide trend towards

autarchy in food production continues. Canadian salmon exports, on the other hand, quickly recovered from the post-war slump, exceeding the 1920 record in 1925. With the depression they also declined and have likewise staged some recovery in subsequent years.

Viewed in terms of total foreign trade, canned salmon exports are of little significance either to Canada or the United States. In both cases they represent less than one per cent of the total value of exports. For the American industry the general expansion of the last 30 years has been built upon domestic rather than foreign markets. In Canadian expansion export possibilities have played a much greater role, and continue to do so.

Distribution of Exports

The foreign markets served by the American packers are widely distributed throughout the world. The predominant position is held by the United Kingdom where there is a large demand for red salmon, the main item of United States salmon exports. In 1938 there were four countries to which the United States shipped over one million pounds of canned salmon: the United Kingdom, France, the Philippine Islands and Australia. About three quarters of a million pounds was exported to the Netherlands. For the last four years United States exports to these five countries in thousands of pounds have been as follows:⁶

	1935	1936	1937	1938
United Kingdom.....	39,827	33,227	29,908	37,284
France.....	—	401	2,100	2,810
Philippines.....	1,195	1,429	1,638	1,825
Australia.....	970	807	965	1,964
Netherlands.....	946	752	365	761
Total Exports.....	45,312	38,893	37,979	48,291

There are two leading importers of Canadian canned salmon, the United Kingdom and Australia. France, British South Africa, New Zealand and the United States are most conspicuous among the numerous smaller markets to which shipments are made. For the last four years Canadian canned salmon exports to these destinations in thousands of pounds have been as follows:⁷

⁶ Data for 1935-37 taken from *Foreign Commerce and Navigation of the United States*, cited, 1935-37; figures for 1938 were obtained from the U. S. Dept. of Commerce.

⁷ *Trade of Canada*, cited, 1934-37. Figures converted to pounds at 100 pounds a cwt.

	1934	1935	1936	1937
United Kingdom.....	14,220	18,760	17,986	19,673
Australia.....	10,646	16,391	12,701	14,481
France.....	3,744	3,880	5,640	5,921
British South Africa.....	2,339	2,675	2,548	3,551
New Zealand.....	2,143	1,837	2,888	3,008
United States.....	50	3,130	1,180	5,598
Total Exports.....	39,165	50,848	47,184	59,179

Great Britain, it will be noted, is the dominant export market for both Canadian and American salmon, and in the case of United States exports absorbs around 80 per cent of the whole. This trading position must be somewhat discounted as an indication of ultimate destination, however, for Britain is not only an important consumer country. She is also a point of transshipment and redistribution, although in lessening degree. She is not a producer, but her exports of canned salmon have averaged about \$1,000,000 in value during the past decade. These exports are supplies originally imported from the United States, the Soviet Union, Japan and the Japanese concessions in Siberia, from which latter source salmon is shipped direct without being tabulated in the foreign trade statistics of Japan.

In the past decade Britain's imports of Canadian and American salmon have shown little change on the whole, while purchases from other sources—Japan and Siberia—have tended to increase. (See Fig. 17.) British imports from the Orient increased during this period from an average of 48.4 per cent of the total in the period 1921-30 to 55.3 per cent in the period 1931-37. In the same interval imports from the United States declined from 33.9 per cent to 29.2 per cent, and those from Canada from 17.7 per cent to 15.4 per cent. The United Kingdom import tax is 10 per cent ad valorem, which applies to the American and Far Eastern imports. In the United States trade agreement with the United Kingdom in 1938 this import duty was not changed, but was bound against increase. Canada has preferential treatment under the Ottawa agreement and pays no duty on salmon in England but this has not stimulated imports from that region.

British brokers tend to secure the bulk of their purchases from the Orient and later purchase the balance of their needs from United States and Canadian sources in order to supply their high-class trade in English and world markets. The higher-cost

canned fish put up by the American packers has long suffered in direct price competition with that of the Far East.

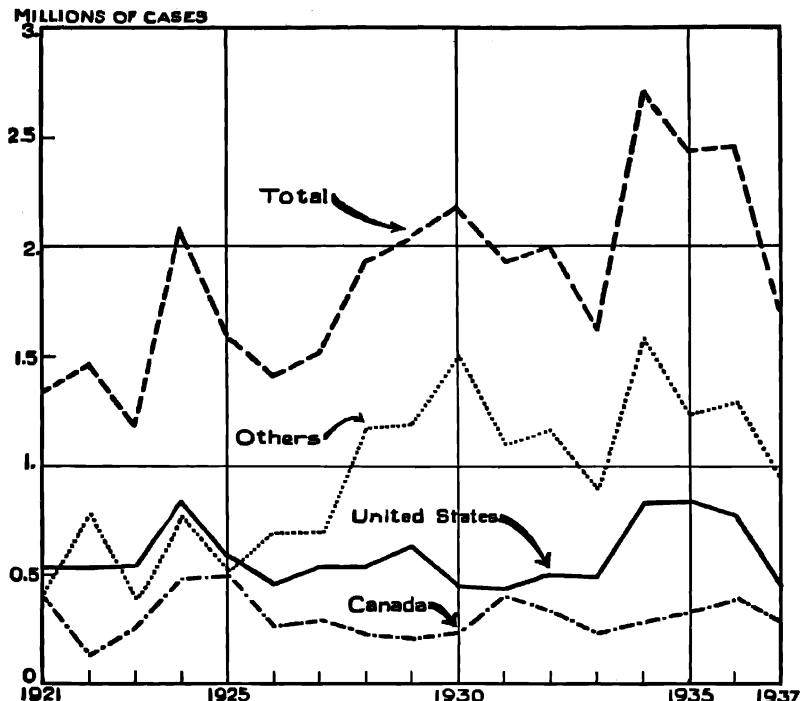


Fig. 17. United Kingdom Imports of Canned Salmon by Country of Origin, 1921-37.

Source: Great Britain, Statistical Dept., *Annual Statement of the Trade of the United Kingdom with British Countries and Foreign Countries, 1921-37* (London).

FOREIGN TRADE IN OTHER SALMON PRODUCTS

Concerning United States salmon products other than canned it may be said that both imports and exports are also small as compared with domestic production. Except for dry-salted salmon which is produced almost entirely for export, these salmon products are mainly consumed within the country. Moreover, they encounter little competition from products manufactured abroad.

Imports of fresh and frozen salmon amounted to 6.4 million

pounds in 1935, 10.5 million in 1936, and 6.6 million in 1937.⁸ Import statistics do not differentiate between imports of the fresh and frozen fish but it is believed that the imports of fresh exceed those of frozen. When it is recalled that the total United States catch of salmon amounted to 689 million pounds in 1937 and that 17.2 million pounds represented the production of frozen salmon in the same year, the small significance of imports is obvious. These shipments come primarily from Canada and are protected by a customs duty which amounted to two cents a pound previous to the 1935 trade agreement. From 1936 to 1938 it was one and one half cents, but was again lowered to one cent in the 1938 revision of the trade agreement.

Exports of fresh and frozen salmon are also listed together and amounted to 3.1 million pounds in 1935, 5.3 million in 1936 and 3.4 million in 1937.⁹ These exports go principally to European countries, mainly to France and the United Kingdom, although in some years Canada also takes sizable amounts.

Pickled and salted salmon are grouped together in foreign trade statistics, so it is impossible to differentiate exactly between the various products. Imports of this whole category, however, usually amount to less than half a million pounds, of which mild cure is said to comprise over 80 per cent. Imports of the latter product come mainly from Canada. They were covered by a duty of 25 per cent ad valorem until 1936, when the rate was changed by the Canadian trade agreement to 20 per cent. The 1938 agreement lowered it again to 12.5 per cent. In view of the fact that United States production of mild-cured salmon amounts to around 10 million pounds a year (see Table 1), it can be seen that imports furnish little competition.

Exports are of more significance, although again these are difficult to determine due to the export grouping. Shipments abroad of pickled, salted or dry-cured salmon amounted to 2.3 million pounds in 1935, 2.0 million in 1936 and 2.2 million in 1937.¹⁰ These are composed almost entirely of mild-cured salmon except for the shipments of dry-salted to the Orient. Mild-cured exports are destined for Europe. As could be expected from the

⁸ *Foreign Commerce and Navigation of the United States*, cited, 1935-37.

⁹ *Ibid.*

¹⁰ *Ibid.*

perishable nature of the product, imports and exports of kippered and smoked salmon are negligible.

As regards Canadian salmon products other than canned, they are virtually all destined for foreign markets. Frozen salmon is shipped mainly to the United States and the United Kingdom, dry salted salmon to Japan, pickled and salted to the United States and Europe. Imports are small, the largest amount being fresh salmon imported from Newfoundland and the United States.

Thus, while the bulk of the salmon from Alaska and the Pacific Northwest is consumed upon the American continent, a strong distinction must be recognized between United States and Canadian production in this regard. The former country has a large internal market which consumes the great majority of its own salmon products as well as a certain amount of the Canadian. Canada, on the other hand, has a smaller domestic market which necessarily makes its salmon industry more dependent on foreign trade.

XI

INVESTMENT, PROFITS, COSTS

THE GENERAL policy of conserving the fishery resource in order to maximize long-term yields rather than to continue to permit destructive exploitation is now an established principle in the salmon fisheries of Alaska and the Northwest. It is sanctioned alike by the public and those directly involved in the industry. Accordingly, the salmon fisheries take on the character of a permanent endowment, maintained intact by scientific regulation and now yielding annually a product of about \$70 millions in recent years.

While no financial calculation of the value of this resource endowment has much meaning, its benefits are nonetheless tangible. It provides an opportunity for the productive investment of labor and capital, which in turn results in the provision of a valuable supply of food to the public. In so doing, it furnishes the underpinning for the whole economy of Alaska, a fact which has economic and political implications for the entire Northwest. This is the American and Canadian stake in the salmon fisheries.

CAPITAL INVESTMENT IN PACIFIC COAST FISHERY INDUSTRIES

The importance of the salmon fisheries as a source of food supply is examined elsewhere in this volume; likewise, their significance as a source of livelihood for thousands of workers and their place in the Alaskan economy. Another aspect of the subject, the importance of the American fisheries in terms of capital investment and profits, is the concern of this chapter.

The following tables present a brief conspectus of the property stake in fishing and fish processing on the Pacific coast. The interrelationship of the various fisheries—salmon, halibut, cod, etc.—makes it impossible to break down capital investment along fishery lines. Accordingly, the figures given here include all categories of fishing and processing activity. In all commonwealths

except California, however, the salmon industry is by far the most important. It accounts for between 80 and 90 per cent of all products as prepared for the market, and a similar fraction of the total fishery investment.

Table 7 gives estimates of the replacement value of plants, equipment and gear directly employed in fishing and processing in the Pacific coast fisheries industries in 1937. Alaska leads, it will be noted, with an investment of almost \$100 millions, or 42 per cent of the Pacific coast investment.¹

The types of equipment making up these regional totals are detailed in Table 8.

Table 9 presents, for earlier years, a series of estimates of the investments in all Alaska fisheries. While similar details are not available for the year 1937, it is clear from Table 7 that the total investment has increased practically six-fold in the period 1911 to 1937. Rising price levels and higher capital values have accentuated this increase. The increase is significant, however, especially when measured against an increase in the output of all processed fish in Alaska amounting only to about 170 per cent in the period.

The salmon fisheries are, of course, the most important in Alaska, their investment far exceeding that of any other fishery and amounting to as much as 90 per cent of the entire fisheries investment for this period. In 1911 the salmon fishery industries in Alaska such as canning, pickling, mild-curing and fish oil production, omitting freezing and cold storage plants, required an investment of \$12.5 millions to produce 145.8 million pounds of marketable products, which was equivalent to 11,596 pounds for each \$1,000 of invested capital. The output per worker² was 9,228 pounds of finished products, of which 97 per cent was canned. In 1925 this investment had risen to \$46.0 millions and the output to 228.8 million pounds, equivalent to 4,970 pounds

¹ While the figures are not comparable, it is interesting to note in connection with the question of investment, that in 1880, \$1,381,900 represented the capital invested in the United States salmon canning industry, of which only \$10,000 were invested in Alaska. See D. S. Jordan and C. H. Gilbert, *The Salmon Fishing and Canning Interests of the Pacific Coast*, Report of the Fishery Industry of the United States, vol. 5 (Washington, 1884), p. 733.

² Includes transport workers and shoresmen, as reported by the Bureau of Fisheries.

of products per \$1,000 of invested capital. By 1937 the total estimated salmon investment had increased to \$84.8 millions (approximately 680 per cent of the 1911 figure) while finished salmon products were 343.8 million pounds, or 4,050 pounds per \$1,000 of investment. Reflecting changes in price levels as well as in technique, the output per \$1,000 of invested capital in 1937 was 35 per cent that of 1911. The output per worker in 1937 was 13,534 pounds of all salmon products as prepared for the markets³—an increase of approximately 50 per cent over the unit output per worker in 1911.

In salmon canning it required a capital investment of \$5,140 to pack 1,000 cases in 1911 in western Alaska;⁴ by 1915 this figure had risen to \$7,530, and in 1925 it was \$13,069, or an increase of about 160 per cent from the earliest date. In central Alaska the investment per 1,000 cases packed in the same three years was \$5,165, \$6,123 and \$6,082 respectively; while in the southeast the figures were \$2,630, \$4,370 and \$7,540, increasing 186 per cent from 1911 to 1925. However, the figure for southeastern Alaska in each of these years is approximately one half that for western Alaska, an important point noted previously in describing production costs and the predominance of the larger companies in this important red salmon district.

Here is also further evidence of the declining relative importance of the western Alaska district compared to those areas lying to the south, nearer the base of supplies and markets. Just prior to the World War the western Alaska district produced approximately one third of the salmon pack and accounted for 37 per cent of the total investment in Alaska. By 1925 its share of the pack had dropped to 18 per cent, while it now had only 23 per cent of the capital investment. Central Alaska has gained relatively and absolutely since the opening of this century, but it is the southeast that has assumed a preponderant importance, accounting for approximately one half of the total investment and the pack in 1925 and later years.

³ Of this amount 97.4 per cent was canned salmon.

⁴ The pack figures employed here and throughout the paragraph are three-year averages centering on the year cited, which are more representative than that for any particular year. Data from *Pacific Fisherman*, 1938 Yearbook Number, p. 75.

Table 7. *Capital Investment in Pacific Coast Fishery Industries: Summary*

	Plant and Equipment	Working Assets	Total
Alaska.....	\$ 68,910,511	\$29,504,000	\$ 98,414,511
California.....	50,798,750	21,166,800	71,965,550
British Columbia.....	21,206,733	9,143,400	30,350,133
Washington.....	13,535,615	5,088,600	18,624,215
Oregon.....	9,831,540	4,632,708	14,445,248
	<hr/>	<hr/>	<hr/>
	\$164,283,149	\$69,526,508	\$233,809,657

Sources: See Table 8. All data in both tables adjusted to 1937 values except for British Columbia.

Table 8. *Capital Investment in Pacific Coast Fishery Industries: Detail by Areas*

Alaska

All cannery ¹ structures and equipment ²	\$17,590,480
Freezing, saltery and miscellaneous plants ²	1,712,000
Traps at cost (in place) ³	3,811,493
Seines, nets and all other gear ⁴	3,861,262
Vessels, boats, accessory and unclassified floating equipment ⁵	28,480,092
Can company rental equipment ⁶	5,750,000
Salmon packer transportation fleet ⁷	4,335,000
U. S. halibut fleet and gear ⁸	3,370,184
Working assets ⁹	29,504,000
	<hr/>
Total.....	\$98,414,511

California

Shore plants, equipment, fishing gear, fishing vessels, boats, etc. ¹⁰	\$50,798,750
Working assets ¹¹	21,166,800
	<hr/>
Total.....	\$71,965,550

British Columbia

All cannery structures and equipment ¹²	\$ 9,278,579
Miscellaneous structures ¹³	3,169,362
Seines, gill nets and miscellaneous gear ¹⁴	1,572,124
Vessels, boats, accessory boats and equipment ¹⁵	7,186,668
Working assets ¹⁶	9,143,400
	<hr/>
Total.....	\$30,350,133

Washington

All cannery structures and equipment, mild-cure, freezing and other structures ¹⁷	\$ 4,363,880
Seines, nets and miscellaneous gear ¹⁸	1,031,153

Vessels, boats, accessory and unclassified floating equipment ¹⁹	7,493,082
Can company rental equipment ²⁰	647,500
Working assets ²¹	5,088,600
 Total.....	 <u>\$18,624,215</u>

Oregon

All cannery structures and equipment, mild-cure, freezing and other structures ²²	\$ 1,935,000
Seines, nets and miscellaneous gear ²³	1,662,240
Vessels, boats, accessory and unclassified floating equipment ²⁴	6,234,300
Working assets ²⁵	4,623,708
 Total.....	 <u>\$14,455,248</u>

¹ Principally salmon and clam canneries.² *Pacific Fisherman*, 1938 Yearbook Number. (See text, p. 179.)³ U. S. Dept. of Commerce, Bureau of Fisheries, *Alaska Fishery and Fur-Seal Industries*, Preliminary Bulletin, 1937 (Washington, 1938).⁴ U. S. Dept. of Commerce, Bureau of Fisheries, *Alaska Fish Warden Reports*. Replacement values furnished by marine supply concerns, fishermen and independent buyers of gear, chiefly packers in the United States and Alaska.⁵ *Alaska Fishery and Fur-Seal Industries*, Preliminary Bulletin, 1937, cited.⁶ Replacement values for can filling, vacuum machines, etc., rented to all salmon canneries in the industry were furnished by principal supply companies and checked with appraisal engineers.⁷ Values furnished by marine underwriters boards, naval architects, insurance and appraisal companies.⁸ Fishing fleet and gear inventory supplied by International Fisheries Commission. Gear values from numerous marine supply companies, fishermen and buyers of gear in the United States and Alaska.⁹ See text, p. 180.¹⁰ Inventories from U. S. Dept. of Commerce, Bureau of Fisheries. Replacement values estimated.¹¹ See text, p. 180.¹² Principally salmon and clam canneries. Dominion Bureau of Statistics, *Fishery Statistics* (Ottawa, 1936).¹³ *Ibid.* Mild-cure, public freezing, reduction plants, wharves, docks, etc.¹⁴ *Ibid.*¹⁵ *Ibid.* Rental value of can company equipment not known for British Columbia.¹⁶ See text, p. 180.¹⁷ Preliminary statement, Washington Bureau of Fisheries, 1935. Values in separate areas, e.g., Puget Sound, Pacific coastal and Columbia River. Adjusted to 1937 inventories and values.¹⁸ *Ibid.* Adjusted for changes in gear investment in Puget Sound area.¹⁹ *Ibid.*²⁰ Estimated. See footnote 6.²¹ See text, p. 180.²² Inventory from R. H. Fiedler, *Fishery Industries of the United States*, 1936, U. S. Dept. of Commerce, Bureau of Fisheries, Administrative Report no. 27 (Washington, 1938). Adjusted to 1937 inventories and values.²³ Inventory from R. H. Fiedler, *Fishery Industries of the United States*, 1935, U. S. Dept. of Commerce, Bureau of Fisheries, Administrative Report no. 24 (Washington, 1936). Adjusted for 1937 values. See footnote 4 for method of computation.²⁴ *Ibid.* See text, p. 179.²⁵ See text, p. 180. Value of can companies rental equipment not known for Oregon.*Note on Valuation of Plants, Floating Equipment and Gear in Table 8*

The inventory of canneries, salteries and freezing plants in Alaska in 1937 (Table 8) is taken from the *Pacific Fisherman*, 1938 Yearbook Number, while that of plants in the states is the authors' tabulation.

NORTH PACIFIC FISHERIES

Table 9. Capital Investment in the Alaska Fishery Industries, 1911-25¹

Items	Western Alaska	Central Alaska	Southeast Alaska	Total
Salmon cannning.....	\$ 5,245,716	\$ 2,629,680	\$ 4,150,154	\$12,025,550
Salmon pickling.....	103,170	30,335	35,475	168,980
Salmon mild-cure.....	....	7,475	369,787	377,262
Halibut ².....	....	9,007	1,185,066	1,194,073
Cod ³.....	....	....	215,670	215,670
Herring.....	....	9,300	285,920	295,220
Total.....	\$ 5,348,886	\$ 2,685,797	\$ 6,242,072	\$14,276,755
1915				
Salmon cannning.....	\$11,418,250	\$ 4,847,011	\$ 9,673,063	\$25,938,324
Salmon pickling.....	246,687	89,925	....	336,612
Salmon mild-cure.....	6,100	4,000	477,259	487,359
Halibut ².....	....	....	2,842,800	2,842,800
Cod ³.....	....	....	570,990	570,990
Herring.....	....	....	211,640	211,640
Total.....	\$11,671,037	\$ 4,940,936	\$13,775,752	\$30,387,725
1925				
Salmon cannning.....	\$12,845,524	\$ 9,749,689	\$21,743,396	\$44,338,609
Salmon pickling.....	156,469	46,531	....	203,000
Salmon mild-cure.....	....	109,083	1,389,342	1,498,425
Salmon, fresh.....	....	....	10,861	10,861
Salmon, drying, dry-salt- ing, smoking.....	25,196	....	....	25,196
Salmon by-products.....	....	....	120,981	120,981
Halibut.....	....	59,594	3,444,327	3,503,921
Cod.....	13,079	384,683	....	397,762
Herring.....	18,490	3,363,644	2,726,360	6,108,494
Clam.....	....	672,244	....	672,244
Crab.....	....	....	59,872	59,872
Shrimp.....	....	....	318,353	318,353
Total.....	\$13,058,758	\$14,385,468	\$28,813,492	\$57,257,718

¹ Includes plants and operating capital, but omits seasonal wage payments. With this exception the total operating capital in 1925 was as follows: salmon cannning—\$15,562,710; salmon mild-cure—\$488,814; salmon pickling—\$60,330; herring fishery—\$3,213,095; halibut fishery—\$1,045,393; cod fishery—\$72,249; total—\$20,451,591.

² Excepting steamers.

³ Unallocated by district, included in southeast Alaska.

Sources: For 1911, U. S. Dept. of Commerce, Bureau of Fisheries, *Report of the Commissioner of Fisheries*, annual, 1911, Doc. no. 766 (Washington, 1912), pp. 44, 48, 51, 55, 62.

For 1915, *ibid.* 1916, pp. 36, 41, 42, 54, 58. Omits whaling industry investment, \$1,453,850, and by-products, \$127,870; includes working capital in salmon canneries.

For 1925, Ward T. Bower, *Alaska Fishery and Fur-Seal Industries in 1925*, U. S. Dept. of Commerce, Bureau of Fisheries, Doc. 1008 (Washington, 1926), pp. 109, 120, 124, 125, 132, 134.

Estimated replacement values were secured by the authors from appraisal engineers, insurance companies and individual operators. Cannery values were checked on a per "Iron Chink" and a per line basis.

Floating and pile traps in place in Alaska are reported by the United States Bureau of Fisheries.⁵ Trap values on a replacement basis were derived from samples of actual construction cost data supplied by operators with locations well distributed throughout the districts in Alaska. The inventory count on all fishing gear for Alaska was secured from the annual *Fish Warden Reports* of Alaska. For the states it is supplied by the United States Bureau of Fisheries.⁶ Replacement values for all areas were secured from local marine supply concerns and independent buyers of gear, the latter principally fishermen and packing concerns in the United States and Alaska.

Inventory counts of the purse-seine and the troller boats were supplied by the managers of the boat owners' associations, who are conversant with actual numbers and values of their member vessels as well as those of nonmembers in the fisheries. The Bureau of Fisheries reports gill-net boats, accessory boats and devices.⁷ Replacement values of all classified floating equipment were derived from frequency distribution tables based on broad sample lists taken from actual recent information supplied by naval architects, builders, appraisal companies and individual owners.

The difficulty encountered in securing reliable inventory count for the various fleets of Alaska, Washington and Oregon is inherent in the fishing industry. For one thing, classifications are difficult to construct and often not consistent within the same class. While a salmon purse-seine boat is a distinctive type of vessel, for example, it may also engage in the pilchard, herring and halibut fisheries; and in some cases it may be chartered for transportation purposes. Moreover, the geographical dispersion of these mobile properties make duplications unavoidable. Vessels may, and frequently do, engage in fishing operations in California, Oregon, Washington and Alaska.⁸ Vessels and boats only infrequently register with state or Federal authorities (as a matter of convenience) when making landings or when coming into jurisdictional waters, that is, within the three-mile limit. Therefore lists from license registrars are not complete and may contain duplications, while state reports seldom correspond with those of the Federal government. Classifications in county records which were examined

⁵ Bower, *Alaska Fishery and Fur-Seal Industries*, cited, 1937, pp. 107, 108, 112, 113.

⁶ Fiedler, *Fishery Industries of the United States*, cited, 1937.

⁷ Bower, cited, 1937, p. 107.

⁸ Intercommunication between Canada and the United States is checked by restrictions upon alien landings and outfitting, and hence as to registration.

are not sufficiently close to justify reliance for either inventory count or valuation purposes. All vessels subject to the United States marine or inland navigation laws are listed by the Federal government and show certain dimensional ratings, ownership and date of building. However, no indication of capital improvements since date of construction or of current values of vessels, nor of exact functions, are given. Full allowances were made however, in the study for duplications in purse-seine, troller boats and cannery tenders, data for which were supplied by boat and vessel owners' associations.

An exception to the general inconsistency of registration is to be found in the data of the United States-Canadian halibut fleet, operating under the authority of the International Fisheries Commission, whose reports give complete information of tonnage, crew, trips and landings by areas of origin.

The valuation of fishing boats in the north Pacific region, now numbering in the thousands, is complicated by the absence of financial statistics. The small fisherman naturally issues no data of a credit character and the number of fishing boats owned outright by the large packing or freezing concerns is relatively small. Moreover, a great variation exists in the extent of depreciation of the power unit, the hull, and of the general ship fittings of vessels and boats, which range in size from five tons and under to as high as 3,000 tons and over. Very few of the old type gasoline powered boats are in commission; their number is rapidly diminishing as a result of conversions to the modern Diesels which now predominate.

In computing working assets for the various branches of the fishery industries, sample financial reports were used for curing and freezing concerns and a representative group of large and small salmon cannerys issuing public statements, the total of whose pack amounted to slightly over 36 per cent of the entire United States pack of eight million cases in 1937.

British Columbia property and fishing gear values in all divisions were secured from *Fishery Statistics*, published by the Dominion Bureau of Statistics.

FINANCIAL STATEMENTS

A concise statement of the financial structure of the salmon packing industry is rendered difficult by the diversity in size and organization of the packers and the conditions under which they operate. There are about 90 American companies in the field, some of them independent concerns and others branches of large nationally known food processors. As noted in the chapter on marketing, considerable difference exists in the degree of

integration in the industry from fishing operations on the one hand to the disposal of the final product on the other. Moreover, the wide geographical dispersion of the companies operating from the Columbia River to Alaska and the lack of assembled financial data also render difficult any summary presentation of the situation of the industry as regards financial position, costs and profits.

As a result one is compelled to resort to a sampling procedure. Yet even this is not easy to employ. With a few exceptions, the operating statements of the large and small concerns alike show a lack of uniformity in accounting procedures and classifications. This condition frequently precludes comparisons between companies, between the plants of different companies, and the plants of the same company operating in the various districts in the United States and Canada.

As an illustration of the varied conditions under which packers operate and finance their activities, it may be noted that a concern in one district may buy fish from independent purse seiners and at the same time operate a fleet of its own boats on the basis of a fixed monthly wage plus a bonus on the number of fish caught. In the latter case the company furnishes the gear and pays the operating expenses of the boat, including meals of the men. Wages may be paid to fishermen in cash, or fish may be purchased outright on a piece or weight basis. Traps may be owned by the packer or rented from independent owners on shares or for cash. In other instances, fish may be purchased from independent trap owners. Trap construction and maintenance involve the purchasing of piling, netting, lumber, etc., and the operation of numerous chartered or owned vessels with accessory devices. Meals and lodging are furnished the crews engaged in fish trap and cannery operations. Common carriers provide transportation to the packers in some districts, while in others a complete fleet of large, expensive vessels must be operated during the season, and frequently kept in idleness during the major part of the year.

Independent Operators

As noted in early chapters, salmon packing may be classified broadly according to whether it is carried on by independent

operators, who market their product through independent selling organizations, or by canneries which are constituent elements in a larger packer-broker combination. The selling methods of the independents are characterized by the absence of a tie-up with the chain systems and large food distributor organizations having national outlets, and has naturally tended to conform to the older orthodox system of packer-to-broker-to-wholesaler method of distribution. The independents also sell to the larger packer broker who uses their unbranded lines to fill out his own stock. They also lend a large support to the independent purse-seine fisherman by affording the latter an outlet for raw fish supplies.

The financial condition of the independent American salmon packers may be gathered in part from the balance sheet data presented below. These are the smaller companies in the industry with assets ranging from \$25,000 to \$500,000, about 75 to 85 concerns in all, operating usually with one or more canneries apiece and rarely with more than three or four in the various regions of the Pacific salmon fisheries. Taken all together they account for approximately 40 per cent of the annual pack. Although overshadowed in size by the big companies like the Alaska Packers Association, Pacific American Fisheries, Inc., the Alaska Pacific Salmon Company, Libby, McNeill & Libby, Nakat Packing Company and other large units, some of them are strategically located and efficiently operated, and play an influential role in the industry.

Financial data were secured from 19 of these so-called independent companies operating in the southern districts of Alaska and in Washington. The great majority were representative of the small-size packers who individually average 65 to 75 thousand cases a year. The combined output of these 19 concerns was approximately 13.2 per cent of the American pack in 1937. The financial indices of their composite balance sheets, showing the current asset-liability ratios, working capital, fixed assets, and the ratio of working capital to fixed assets (plant equipment, etc.) of these independent packers are given in Table 10.

The individual statements of the independent salmon packers show wide variations in the various asset and liability items, some companies carrying relatively large amounts of fixed property while others have but small investments in long-term assets.

Table 10. Ratio of Working Capital to Fixed Assets and Current Assets: Nineteen Independent Salmon Packers, 1937-38

Company Number	Ratios		Working Capital ²	Fixed Assets (Net)	Per Cent of Working Capital to Fixed Assets
	Current Assets to Current Liabilities ¹				
1.	1.52-1		\$ 29,000	\$ 18,000	161.0
2.	1.06-1		9,200	50,000	18.2
3.	4.12-		125,000	57,000	218.0
4.	.94-		-9,500	76,400	..
5.	1.53-		8,000	75,000	10.7
6.	1.58-		81,200	179,700	45.1
7.	1.01-		23,200	35,100	66.0
8.	.77-		-30,500	46,000	..
9.	8.28-		233,000	208,000	112.0
10.	4.82-		17,200	12,500	137.6
11.	1.17-		16,400	78,300	20.9
12.	1.81-		60,000	300,000	20.0
13.	.71-		-38,000	37,000	..
14.	1.64-		132,000	317,000	41.6
15.	.96-		-14,000	56,000	..
16.	1.09-1		21,200	57,780	36.7
17.	.60-1		-5,600	24,200	..
18.	3.00-1		165,000	51,013	32.3
19.	1.78-1		43,000	76,500	56.1

¹ The current assets of the 19 companies were apportioned as follows: cash, 3.92 per cent; accounts receivable, 16.24 per cent; inventory (canned salmon), 73.81 per cent; deferred charges, 6.02 per cent.

² Current assets minus current liabilities.

Source: Derived from a composite balance sheet for the years 1937-38 not reproduced here, which was compiled from data on assets, liabilities and net investment furnished by the companies.

The ratio of current assets, and especially inventories of canned fish, to total assets, and of inventories to current assets is high. This is attributable in good part to seasonality of packing operations which requires large advances and the accumulation of heavy inventories. The experience of the larger firms apparently points to the necessity of owning a relatively large working fund which is needed for the greater part of the year, first as advance money for fishing and canning operations and later for carrying the finished stock in the winter months until such time as it is sold. The ratio of current assets to current liabilities is universally low. The evidence suggests that the average small salmon packer is operating with a shortage of invested capital causing him to be a heavy borrower on short term.

The usual hazards involved in fishing and packing operations and also the uncertainties of marketing single-line products under unknown brands or those of selling agents are some of the busi-

ness risks involved in small-scale operations. The relatively narrow margin of inside equity in current assets and the tendency toward heavy borrowings explain the generally low credit rating of the small operator. The necessity of unloading the season's pack early in order to meet short-term borrowings, to pay labor and supply bills, and at the same time to avoid the risks of holding stock through the season, forces quantities of canned salmon on the market in the late summer and early fall and generally in periods of declining prices.⁹

The Large Packers

In contrast to the small independent packers stand the large concerns whose assets run into millions of dollars. As described in Chapter VI, 58 per cent of the total American pack was accounted for by 9 leading companies in 1937. In Alaska and the states they owned or controlled 47 per cent of the traps (excluding Columbia River), and 38 per cent of the total canneries. Five of the 9 large concerns packed in the western Alaska district in 1937. Here they owned or controlled 78 per cent of the canneries and packed about 77 per cent of the output. Eight of them packed in central Alaska, where they operated 30 per cent of the canneries and 41 per cent of the traps, and put up 58 per cent of the salmon. In southeastern Alaska 6 companies in the same group¹⁰ operated 35 per cent of the canneries and 51 per cent of the traps, and put up 54 per cent of the pack. For further details of the dominant position of the large packer brokers, the reader is referred to Chapter VI.

A brief financial résumé of the position of three leading salmon packers as shown by their published annual statements is given in the following pages. (See Tables 11, 12, 13.) The absence of uniform accounting methods employed by these leading concerns, especially as regards the valuation of plant investments and intangibles, makes exact comparison of their earnings and profits on plant investment rather difficult. Nevertheless these figures (certified by reputable accountants) have been reproduced here to show the trends of recent years in the financial history of each company. In analyzing values, the net cost after depreciation has

⁹ See above, p. 125.

¹⁰ Three of these are included in the group of five which packed in western Alaska.

been used. First is the Alaska Packers Association, the oldest and one of the largest companies in the industry. (See Table 11.)

Several conspicuous features of the financial history of this concern are worthy of note. First is the constancy over a period of 25 years (1900 to 1924) in the fixed asset investment which averaged five and a half million dollars; and second, the tendency from 1922 to the late depression for the ratio of the fixed asset investment to the 1,000 cases packed to increase, owing in part to the decline in the pack of Bristol Bay where this company centers a large share of its operations. From 1900 to 1909 fixed assets averaged \$4,964 per 1,000 cases, and from 1910 to 1919 \$4,936. In the next decade they rose to \$9,028, only to increase to \$10,221 during the period 1930 to 1938. The lessened earnings per share in the post-war period 1920-38, and especially during the past decade, is a third noteworthy fact. From 1910 to 1919, a period which included the war boom, the average net profit was 24 per cent on fixed assets;¹¹ from 1920 to 1929 it was 12.7 per cent. For the period 1930 to 1938 the company suffered a net loss of one half per cent, the poorest experience on record for a comparable period. The loss of this company in 1938 is put at \$719,962.

A fourth feature of the A.P.A.'s financial history is its dividend record. Cash dividends were paid continuously from 1893 to 1938, except for the years 1906-09 and 1932-34. In some years the payments were in excess of the year's earnings. Especially noticeable is the payment of \$2,875,400 from 1930 to 1938 in the face of losses totalling \$31,900.

Some of the outstanding features of the financial history of Pacific American Fisheries, Inc., the largest single packing concern today, are: (a) consistency in the total fixed asset investment over the past 18 years from 1920 to 1938,¹² with a tendency to increase through the late 1920's and to decline from then to 1935; (b) a definite improvement in the ratio of plant investment (after depreciation and including fishing rights and trap sites) to

¹¹ See Table 11, fn. 2, for comment on the valuation of fixed assets.

¹² Throughout this paragraph the years are designated in conformity with Table 12. As noted there, years through 1933 are calendar years. From 1935 on they are fiscal years ending February. This means that the year 1938 covered the 1937 packing season.

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Table 11. Financial Data on Alaska Packers Association

Comparative Balance Sheet¹

Assets	1935	1936	1937	1938
Current Assets				
Cash on hand.....	\$ 525,574	\$ 522,046	\$ 641,622	\$ 590,079
Marketable securities.....	459,885	398,105	397,106	516,397
Trade accounts (net).....	.....	.....	101,529	110,886
Notes receivable.....	180,904	135,444	.....	.....
Due from Calif. Packing Co.	1,110,623	96,189	30,201	190,389
Inventories: salmon.....	.....	.....	4,531,935	4,562,657
Inventories: materials, supplies.....	2,423,565	3,813,655	1,150,782	1,113,204
Total	\$ 4,700,571	\$ 4,065,439	\$ 6,853,175	\$ 7,083,612
Investments	225,005	225,005	239,705	277,469
Plants, terminals, fleets (net) ²	5,851,957	6,065,249	6,274,522	6,276,460
Deferred charges.....	287,192	239,954	266,166	352,445
Total Assets	\$11,065,625	\$11,496,548	\$13,633,568	\$13,989,986
Liabilities and Net Worth				
Current Liabilities				
Notes and accounts payable.....	\$ 93,481	\$ 72,378	\$ 2,334,713	\$ 3,670,349
Accrued expenses.....	104,937	226,284	236,817	222,349
Provision for income taxes.....	138,200	69,200	54,850	14,900
Other items.....	117,548	339,561	115,739	66,667
Total	\$ 454,166	\$ 707,423	\$ 2,742,119	\$ 3,974,265
Purchase money obligation.....	.....	.....	200,000	133,333
Capital stock.....	5,750,800	5,750,800	5,750,800	5,750,800
Surplus.....	4,860,059	5,038,326	4,940,049	4,131,588
Total Liabilities	\$11,065,625	\$11,496,549	\$13,633,568	\$13,989,986

Comparative Income Statement

	Profits	Number of Cases Packed	Profits per Share	Profits per 1,000 Cases	Dividends Paid	Fixed Assets per 1,000 Cases
1803-1809						
Total.....	\$ 4,446,044	4,717,675	\$ 96.14	\$ 6,684	\$2,542,194	..
Annual average	635,235	673,953	13.73	955	348,885	..
1900-1909						
Total.....	5,261,519	11,873,376	120.74	5,094	2,927,655	\$ 4,964
Annual average	526,152	1,187,377	12.07	509	292,765	
1910-1919						
Total.....	13,958,443	11,312,312	264.24	12,165	6,656,703	4,936
Annual average	1,305,844	1,131,231	26.42	1,216	665,670	
1920-1929						
Total.....	6,669,411	6,735,559	113.43	9,626	6,694,794	9,028
Annual average	666,941	673,556	11.34	963	669,479	
1930-1938						
Total.....	31,935 ³	6,308,314	0.56 ⁴	5.06 ⁵	2,875,400	10,221
Annual average	3,548 ³	700,923	0.060 ³	5.62 ⁴	319,488	

¹ Calendar year.² "The Capital Assets acquired in 1803: additions since that date recorded at cost. In 1804, 1901 and 1902 these values were increased by \$591,061 to sound values by appraisals. Present values at cost less depreciation." *Annual Report*, December 31, 1933.³ Deficit.

Source: Published annual statements.

Table 12. Financial Data on Pacific American Fisheries, Inc.

Comparative Balance Sheet¹

Assets	1935 ²	1936	1937	1938
Current Assets				
Cash in bank.....	\$ 144,186	\$ 437,681	\$ 309,560	547,348
Notes and accts. rec. (net).....	188,350	841,273	589,230	971,275
Inventories (canned salmon).....	1,836,844	2,942,737	2,787,058	3,390,004
Other current assets.....	360,384	205,306	273,405	342,261
Total	\$ 2,538,764	\$ 4,487,087	\$ 3,959,271	\$ 5,259,888
Working assets	577,480	540,837	606,607	1,002,527
Plants and terminals (net).....	3,097,075	4,177,017	3,792,912	4,872,347
Trademarks.....	275,000	275,000	275,000	275,000
Total assets	\$ 7,298,319	\$ 9,479,941	\$ 8,633,790	\$ 11,409,762
Liabilities				
Current Liabilities				
Notes and accts. payable.....	\$ 713,083	\$ 1,554,648	\$ 1,304,831	\$ 3,875,081
Accrued liabilities.....	202,443	101,301	98,747	55,165
Provision for income tax.....	91,382	85,357	126,072	183,109
Other current items.....	13,100	58,303	11,830	12,464
Total	\$ 1,020,008	\$ 1,790,609	\$ 1,541,480	\$ 4,125,819
Mortgage notes		286,850		
Total	\$ 1,020,008	\$ 2,080,459	\$ 1,541,480	\$ 4,125,819
Capital stock, preferred		1,200,000		
Capital stock, common.....	4,633,080	1,570,040	1,027,340	1,884,340
Surplus.....	1,045,231	4,623,442	5,164,970 ³	5,399,603 ³
Total liabilities	\$ 7,298,319	\$ 9,479,941	\$ 8,633,790	\$ 11,409,762

Comparative Income Statement¹

Year	Shares	Plants, Terminal Fleets (net)	Divi- dends	Profits	Cases Packed	Earned per Share	Profits per 1,000 Cases	Capital Assets per 1,000 Cases ⁴	Profit: (per Cent)
1920...	35,000	\$4,024,458	5	5	346,900	5	5	\$11,597	8
1921...	35,000	4,024,918	5	5	166,404	5	5	24,246	5
1922...	45,000	3,670,587	5	5	274,636	5	5	13,347	5
1923...	45,000	3,814,420	\$170,998	5	442,070	5	5	8,620	5
1924...	45,000	3,764,310	\$ 360,577	500,821	\$ 8.21	\$ 730	7,528	9.8	
1925...	45,000	3,810,060	5	103,788	300,918	2.31	259	9,525	2.7
1926...	45,000	3,826,188	180,000	501,773	680,218	11.15	738	5,026	13.1
1927...	45,000	3,871,671	180,000	443,438	481,770	9.85	910	8,032	11.7
1928...	45,000	4,332,553	180,000	618,735	574,565	13.74	1,077	7,548	14.2
1929...	315,204 ⁵	5,834,394	488,900	1,080,578	952,852	3.44	1,140	6,122	18.6
1930...	315,204	6,068,663	630,363	872,088	877,433	2.76 ⁷	994 ⁷	6,010	14.3 ⁷
1931...	315,204	5,831,720	0	327,145 ⁷	658,228	1.03 ⁷	497 ⁷	8,862	5.6 ⁷
1932...	315,204	4,314,140	0	707,170 ⁷	400,260	2.53 ⁷	1,040 ⁷	10,548	18.4 ⁷
1933...	315,204	4,092,474	0	473,959	721,150	1.50	657	5,076	11.5
1934 ⁸ ...	8	3,982,075	0	337,719	863,602	1.07	391	4,608	8.2
1936...	0	4,452,017	123,502	506,136	603,007	1.55	839	7,383	11.3
1937...	385,468	4,067,912	758,272	703,273	1,045,205	1.82	673	3,892	17.2
1938...	376,868	5,147,347	459,981	766,928	1,022,320	2.03	750	5,035	14.9

¹ Prior to 1934, year ending December; 1935 to 1938, year ending February.² For 14 months, Jan. 1934 to Feb. 1935.³ Including reserve for insurance.⁴ Capital assets, including trademarks, taken from book figures as published by the company in its annual reports.⁵ Data not available.⁶ New shares issued on a 7 to 1 basis.⁷ Losses.⁸ Preferred 12,000, common 314,008.

Source: Published annual statements.

the 1,000 cases packed; (c) a high degree of consistency since 1921 in earnings, which, on an average for both the pre-depression and the post-depression years, amounted to slightly over \$500,000 per year; (d) an increasing rate of earnings on capital assets (omitting intangibles), which rose from 2.7 per cent in 1925 to 18.6 per cent in 1929, and from 11.5 per cent in 1933 to 14.9 per cent in 1938, with losses in 1930-32; and (e) an improvement in earnings on common stock preceding and following the depression.¹³

The relatively short period of time for which published data are available for the third large packer in Alaska—Alaska Pacific Salmon Company—makes comparisons with the other concerns difficult. However, the information at hand covering the years 1934 to 1937 shows several noteworthy facts. Some of the more important are: (a) the comparatively small investment in fixed assets and the low ratio to the 1,000 cases packed, which was \$2,595 in 1934, \$3,907 in 1935, and \$2,822 in 1936 (or less than one fourth of the average outlay of Alaska Packers Association during the period 1930-37); (b) the small amount of net operating profit per 1,000 cases—\$397.50 in 1936, \$364.30 in 1935 and \$58.09 in 1934 after income taxes, charges for idle plants and plant retirements; (c) the relatively high inventories of canned salmon carried on credit, characteristic of a majority of companies including the Alaska Packers Association and Pacific American Fisheries; and (d) the relatively low current ratio (1.66 to 1 in 1934; 2.12 to 1 in 1935; 1.82 to 1 in 1936; 1.43 to 1 in 1937) which is also common in the industry.

The financial indices presented in Table 14 show that the large concerns have a number of financial advantages not enjoyed by the small firm. First is a much larger amount of working capital (net assets minus current liabilities). That of the three big companies averaged \$2,212,800, while that of the 19 independents averaged \$45,570. Second is the relatively larger per cent of the inside or owner's investment, which averaged 67 per cent of all assets for the big packer against 53 per cent for the smaller. A third is the current ratio (current assets to current liabilities) which averaged 1.68 to 1 for the composite of the large packers as compared with 1.53 to 1 for the independents.

¹³ The year ending February 1939, however, not shown in Table 12, witnessed a net loss for the company of \$1,010,000.

Table 13. Financial Data on the Alaska Pacific Salmon Company

Comparative Balance Sheet¹

Assets	1934	1935	1936	1937
Land (cost)	\$ 26,602	\$ 27,517	\$ 28,040	\$ 29,040
Building, machinery (net)	1,390,259	1,242,946	1,112,488	1,068,826
Fishing rights, trap sites, etc.	1,133,436	1,141,357	1,066,256	1,051,273
Trademarks, etc.	250,000	250,000	250,000	250,000
Investments (cost)	5,136	27,618	2,642	1,391
Cash	35,076	27,269	11,697	21,847
Notes and accounts receivable	228,071	203,485	470,622	329,257
Inventory, salmon ²	1,516,881	1,473,872	1,863,193	2,244,104
Materials and supplies	531,787	468,303	470,754	584,944
Prepayments	3,670	25,070	15,104	6,445
Total	<u>\$5,120,919</u>	<u>\$4,887,443</u>	<u>\$5,290,796</u>	<u>\$5,587,127</u>
Liabilities				
Preferred stock	—	—	\$ 303,642	\$ 432,950
Common stock	—	—	3,117,105	3,084,946
Capital stock	\$3,717,718	\$3,717,868	—	—
Bank loans	1,138,124	784,830	1,372,930	1,390,000
Accounts payable	134,318	92,450	167,031	252,047
Accrued taxes, etc.	118,592	111,367	203,439	153,033
Capital surplus	—	—	60,254	80,197
Earned surplus	12,167	180,920	23,605 ³	193,954
Total	<u>\$5,120,919</u>	<u>\$4,887,443</u>	<u>\$5,290,796</u>	<u>\$5,587,127</u>
Net value	870,941	907,525	1,116,970	—
Working capital	924,451	1,209,358	1,087,971	1,392,980

Comparative Income Account

Gross profit	\$ 708,960	\$ 803,593	974,369	\$ 1,110,968
General and administrative expenses . . .	117,419	115,338	120,193	117,990
Selling and handling expenses	249,348	325,704	422,901	450,100
Operating profit	342,201	362,551	431,185	542,787
Other income	11,200	14,400	72,527	12,599
Total income	<u>\$ 353,401</u>	<u>\$ 376,951</u>	<u>503,712</u>	<u>\$ 555,386</u>
Interest and discount	68,662	59,594	63,170	65,820
Idle plant expense	136,175	59,311	40,598	35,449
Loss on plant retirement	100,159	22,050	13,728	17,427
Income tax	6,500	34,000	59,639	73,634
Dividends for year	24,234	32,317	511,405	78,782
Surplus for year	17,060	168,762	191,827 ⁴	363,036

Earned per share, preferred \$ 0.45 2.18⁴ 16.29
Earned per share, common⁵ 0.13⁶ 1.33 2.48⁷

¹ Years ending December 31.² 56 per cent pledged in 1936; 59 per cent in 1935; 70 per cent in 1934.³ Deficit.⁴ Class A stock.⁵ Earnings in previous years: 1931—\$3.72; 1932—\$6.25 (loss); 1933—\$1.64 (loss).⁶ Based on actual Class A dividends paid.⁷ After \$1.00 paid on preferred stock.

Source: Published annual statements.

Table 14. Comparative Financial Analysis of Three Large Packers and Nineteen Independents

	Alaska Packers Association ¹	American Fisheries, Inc. ²	Alaska Pacific Salmon Co. ³	19 Independent Companies ⁴
Current ratio.....	1.78-1	1.51-1 ⁵	1.77-1	1.53-1
Working capital.....	\$3,109,400	\$2,136,000 ⁵	\$1,392,900	\$865,800
Inside or owner's investment.....	70.6 %	63.8 %	67.8 %	53.0 %
Fixed assets to total assets.....	44.9 %	45.1 %	42.9 %	35.6 %
Current assets to total assets.....	50.6 %	54.8 % ⁵	57.0 %	64.3 %
Inventories to total assets.....	40.47 %	45.1 %	54.2 %	39.8 %
Receivable to total assets.....	0.79 %	8.51 %	5.89 %	18.0 %
Cash to total assets.....	4.21 %	4.79 %	0.039 %	2.52 %
Current liabilities to net worth.....	40.2 %	56.6 %	47.3 %	79.26 %
Fixed liabilities to net worth.....	1.35 %	None	None	0.95 %
Net worth to fixed assets.....	157.4 %	141.0 %	158.0 %	149.0 %

¹ December 31, 1938.² February 28, 1938.³ December 31, 1937.⁴ December 31, 1937 and 1938.⁵ Includes working assets.

Sources: See Tables 10 to 13.

The average small concern carries a larger floating debt than the big packer by borrowing approximately 80 per cent of its inside investment (mostly for carrying on current operations) as compared with 48 per cent borrowed by big concerns. The small operator has also a larger percentage of his money tied up in current assets (64 per cent as compared with 54 per cent). The relatively heavier investment of the big packer in fixed assets (44 per cent as compared with 36 per cent), is explained on the ground of his ownership of floating equipment, traps, terminals and other structures, which the smaller concern in most instances uses on a service rental basis.¹⁴ The small company tends to grant more credits to customers. It has 18 per cent of all assets in outstanding open accounts, whereas the average of the larger concerns shows only 4 per cent of all assets tied up in trade accounts. The ratio of all inventories to total assets shows the large holder with a 6 per cent greater investment (the difference made up largely of operating supplies) but the percentage of canned salmon to current assets averaged 73 per cent for the little fellow as compared with 65 per cent for the big one.

¹⁴ Traps are excepted; these are not used on a service basis.

In the matter of cash holding, all packers investigated—large, small and medium-size alike—show a universally small amount of cash on hand. The average for the big operators was 3 per cent of all assets, with a slightly lesser figure (2.5 per cent) for the marginal concern. Both groups show approximately the same ratio of net owner's investment to fixed assets, approximately 150 per cent for each group (no adjustments were made for write-ups or intangibles). A relatively lesser value is placed on the intangibles (trademarks, fishing rights, etc.) in the small operator balance sheet.

None of the large companies carried any fixed liabilities in the form of mortgages or bonds except the Alaska Packers Association, which showed a minor item equal to one tenth per cent of all credits. Only 2 of the 19 independents carried any fixed debts, and they were of minor significance. The salmon cannery industry evidently has not used this type of financing for expansion, as mentioned previously, partly because of the absence of fee-title property in Alaska upon which mortgages could be placed and also because of the great variability in income.

AGGREGATE PROFITS AND LOSSES IN THE ALASKA SALMON INDUSTRY

Table 15 presents the earning record of the Alaska salmon industry from 1919 to 1937, as reported officially by the companies for tax purposes. It gives the aggregate net profit and loss reported by all concerns operating in Alaska during these years. As will be seen, there was considerable fluctuation, with heavy losses reported during the two depression periods, 1920-21 and 1930-32. Total net profits reported from 1919 to 1934 were only \$839,131. Profits for the years 1935, 1936 and 1937 were \$2,761,285, \$3,396,125 and \$2,792,170 respectively, making a grand total of \$9,788,711 for the 19-year period.

To the extent that these figures can be relied upon, it can hardly be said that the earnings record of the Alaskan industry is a highly favorable one, viewing the post-war period as a whole. Average annual profits for the entire industry amounted to \$515,000 per year for the 19 years. These aggregates, of course, do not reflect the wide divergence among the 70 to 80 firms making up the total. As noted previously, certain firms have profited

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Table 15. Aggregate Net Profits and Losses in Alaska Salmon Industry,
1919-37¹

Year	Profits	Losses	Net Aggregate Profit or Loss
1919	\$ 2,183,000	\$ 912,200	\$1,270,800
1920	239,600	3,814,000	3,574,400 ²
1921	595,908	3,261,400	2,665,492 ²
1922	2,148,945	2,057,300	91,645
1923	2,209,157	534,400	1,674,757
1924	2,398,077	179,600	2,218,477
1925	1,925,569	683,815	1,241,754
1926	4,187,000	370,000	3,817,000
1927	2,475,300	1,770,810	704,490
1928	3,600,000	370,700	3,229,300
1929	4,212,300	353,800	3,858,500
1930	403,900	5,127,900	4,724,000 ²
1931	359,200	3,943,400	3,584,200 ²
1932	110,600	6,452,100	6,341,500 ²
1933	1,378,000	286,000	1,092,000
1934	2,604,500	74,500	2,530,000
Total.	\$31,031,056	\$30,191,925	\$ 839,131
1935	..	..	2,761,285 ³
1936	..	..	3,396,125 ³
1937	..	..	2,792,170 ³
Total for 19-year period			\$9,788,711

¹ Records of 1919-34 in the office of the Territorial Treasurer, Juneau, Alaska, as quoted in the testimony of Walstein G. Smith, published in *Fish Traps in Alaskan Waters, Hearings before the Committee on Merchant Marine and Fisheries on H. R. 4254 and H. R. 8213*, 74th Cong., 2nd sess. (Washington, 1936), p. 157.

² Net loss.

³ Computed from statements of income taxes paid to the Treasurer of Alaska and reported by Oscar G. Olson, Treasurer, quoted in U. S. Dept. of Commerce, Bureau of Fisheries, *Alaska Fishery and Fur- Seal Industries* (annual), 1935, p. 12; 1936, p. 290; 1937, p. 87 (Washington).

These data are slightly above real net profits due to the fact that the rate (one per cent) is applied before charging interest on bonds and borrowed money or taxes paid outside of the Territory. Serious losses were sustained in 1938.

substantially, while others have incurred heavy losses. The tabulation actually underrates losses, however, according to the source from which the figures are taken, for in bad years certain small operators who were in financial difficulties failed to file statements. There is no indication as to what extent deficits represent capital losses attributable to bankruptcies or to write-offs of capital assets following some of the ill-starred mergers of the post-war decade. Information from other sources suggests, however, that these recorded losses were due largely to operations.

COSTS IN ALASKA CANNERIES

Sample Operating Data

The data on costs presented below are compiled from the records of packers, large and small, who operate in the various districts of Alaska. In examining them one should bear in mind the diversity of cost conditions in the industry, and the year-to-year variations in the size of the pack and the level of wages and other expenses of operation. Admittedly inadequate to provide a complete picture of costs in the Alaskan industry, they are nevertheless believed to be representative. Taken together, they throw some light on salmon packing costs in recent times.

The distribution of the price received (per case) for canned Alaska salmon in 1937 among the constituent items of cost and profit was approximately as follows:¹⁵

	Amount	Per Cent
Selling price received per case.....	\$5.081	100.0
Cost of Packing.....	3.732	73.4
	_____	_____
Labor.....	.634	12.5
Materials (raw fish).....	2.799	55.1
Cannery overhead.....	.298	5.8
	_____	_____
Administrative overhead.....	.254	5.0
Selling and other costs.....	.595	11.7
	_____	_____
Net profit per case.....	.500	9.8

This tabulation is based on data supplied by a representative group of canneries operating in all three districts of Alaska in 1937. About 10 per cent of the selling price was retained by the companies as profit, and 17 per cent absorbed by selling, general administrative overhead, etc. The balance, 73 per cent, represented packing cost, in which the largest item was the cost of raw fish and the remainder cannery packing and maintenance labor and overhead.

Judged by financial indices the year 1937 was fairly representative of salmon canning conditions in Alaska and the Northwest. Plants were fully occupied and the output, while less than in the peak year 1936, was slightly above normal. Financial statements

¹⁵ These are figures supplied by the industry. Inventory losses for 1937 are not included in the computation.

revealed profits at first view to be equal to those of the post-depression years in general (see p. 192), especially for those concerns operating in Alaska. It must be added by way of fuller explanation, however, that the net gains proved to be paper profits in very many instances.¹⁶

These estimates of salmon costs in Alaska are necessarily averages. As such they fail to portray the wide diversity of cost conditions which in fact exists. The various species of salmon command different prices in the market and raw fish costs depend upon the relative abundance of the supply within reach of a cannery. Fishery techniques vary considerably from one section to another, as exemplified in the fact that gill-net fishing with no traps is the predominant form in Bristol Bay, center of the red salmon industry, whereas the pinks and chums of central and southeastern Alaska are caught chiefly with traps and seines. Moreover, even within the same area, costs vary among companies in accordance with their location, the efficiency of their equipment, their reliance on supplies purchased from independent fishermen, and a host of other factors.

This variation in costs among individual canneries is illustrated in Table 16 below. Here is presented a comparison of costs per case in 27 canneries packing various species in various locations in 1937. As will be observed, the total costs per case in a cannery packing red salmon may be more than double those in a plant devoted to pinks and chums, and there may even be a wide divergence within a single species.

¹⁶ The year 1937 opened propitiously for most of the packers. The American pack, while less than that for 1936 by 1,457,100 cases, was fairly heavy in reds, but comparatively low in pinks and chums. Bristol Bay actually packed a larger supply of reds than in the peak year previous, while many central and southeast districts ran lower in the cheaper lines than for many years past. Prices were well sustained for all grades throughout the year, but the advancing quotations in the latter half of the year tended to slow up the actual shipments to the secondary markets which resulted in a legacy of an extremely large carry-over for 1938. Labor and other packing costs which had begun advancing in 1935-36 rose still higher in 1937. In 1938 prices were drastically cut throughout the year to move the old and new stocks. By the spring of 1939 the carry-over had been reduced to normal size, but heavy losses were sustained in the price decline and more particularly from the refunds made by the packers who sold their stock subject to price guarantees.

Further evidence of this disparity in costs is provided in Table 17, which gives a more detailed breakdown of costs in two canneries in 1936. Cannery "A" packs pink salmon in southeast

Table 16. Salmon Packing Costs in Twenty-Seven Alaska Canneries, 1937¹

(in dollars per case)

Cannery No.	Fish Costs: Cannery			General Expenses	Misc. Expenses	Misc. Income	De-livery South	Total Cost	Species
	Trap and Seine	Operations							
1.....	\$1.743	\$2.051	2	2	1	1	\$186	\$3.988	Pinks and chums
2.....	3.052	3.730 ⁴	2	2	1	1	.486	7.868	Reds
3 ⁵	3.567	3.185	2	2	1	1	.538	7.290	"
4.....	1.870	2.102	2	2	1	1	.192	4.164	Pinks and chums
5.....	1.304	2.226	\$1.680	2	1	1	0	5.210	Mixed
6.....	1.012	2.483	.377	\$.507	2	1	.288	4.667	Pinks and chums
7.....	1.485	1.698	.925	.471	1	1	.184	4.763	" " "
8.....	1.092	2.437	.680	2	\$.064	1	0	4.745	" " "
9.....	2.116	2.362	.429	1.042	.045	1	0	5.904	Mixed
10.....	3.370	1.576	.507	.140	1	1	0	5.593	"
11.....	1.347	1.801	.686	2	.009	1	.360	4.185	Pinks and chums
12.....	1.207	1.545	.450	2	1	1	.364	3.566	" " "
13.....	1.159	1.858	.621	2	.073	1	.406	3.971	" " "
14.....	.844	1.788	.540	2	.006	1	.392	3.558	" " "
15.....	1.755	1.771	.583	2	.052	1	.426	4.484	" " "
16.....	3.263	2.654	1.324	2	.030	1	.485	7.606	Reds
17.....	2.434	2.142	1.059	2	.005	1	.438	6.068	Mixed
18.....	2.713	2.074	.872	2	.010	1	.445	6.094	"
19.....	2.865	2.712	1.210	2	.134	1	.565	7.218	Reds
20.....	1.000	1.405	.825	.590	1	1	.100	3.980	Pinks
21.....	2.500	2.135	1.870	1.220	1	1	.100	7.825	Reds
22.....	1.862	3.203	2	2	1	1	.213	5.278	Pinks and chums
23.....	.981	2.310	2	2	1	1	.196	3.487	" " "
24.....	1.414	2.984	2	2	1	1	.176	4.574	" " "
25.....	1.003	2.102	2	2	1	1	.102	3.387	" " "
26.....	1.640	2.775	2	2	1	1	.182	4.597	" " "
27.....	1.532	2.540	2	2	1	1	.235	4.307	Mixed

¹ F.o.b. primary market; no storage costs included.

² Included with cannery operations.

³ No data available.

⁴ Includes general operating costs. No administrative or selling expenses are charged.

⁵ An average of five canneries in Bristol Bay.

⁶ Included in general expenses.

Source: Data submitted to authors.

Alaska; cannery "B" operates in Bristol Bay. Both are owned by the same company, and both have a high reputation for efficiency in the industry. The cost data are presented in the form in which they were submitted by the company.

Table 17. *Salmon Packing Costs in Two Alaska Canneries, 1936¹*

Item	Cannery "A" Southeast Alaska (pinks)	Cannery "B" Bristol Bay (reds)
Fish, delivered to cannery.....	\$1.00	\$2.50
Labels.....	.05½	.05½
Cans ².....	.95	.95
Fiber boxes.....	.13	.13
Oriental labor.....	.25	.65
White labor ³.....	.08	.35
Office personnel.....	.10	.10
Depreciation of cannery, etc.....	.02½	.07
Depreciation of operating equipment.....	.02½	.05
Maintenance of cannery, docks, etc.....	.07½	.10
Maintenance and equipment.....	.08	.20
Operation and depreciation of floating equipment, tenders, etc.; installation of traps ⁴.....	.17	.21
Power.....	.03	.04
Mess for white workers.....	.04	.20
Transportation of help.....	.06½	.18
Transportation of supplies.....	.02	.35
Transportation of pack.....	.18½	.35
General factory expenses.....	.01	.02
Insurance.....	.04	.16
Rent of equipment.....	.02½	.07
Salmon taxes (Federal and territorial).....	.12	.28
Shipping expenses.....	.10	.10
Interest on borrowed funds.....	.13	.22
Unemployment and old age insurance.....	.02½	.09
Administrative expenses.....	.25	.40
Total.....	\$3.98	\$7.82½

¹ Costs for cannery "A" were figured on the basis of an output of 110,000 cases of pink salmon in 1936; for cannery "B" an output of 100,000 cases of reds was assumed.

² Includes labor expense of 18½ cents for completing the manufacture of cans.

³ Excludes maintenance, repair, etc.

⁴ Includes maintenance of floating equipment.

Source: Data submitted to authors.

Table 18 gives a more comprehensive, if less detailed, comparison of costs and profits by regions of Alaska. It covers the five years 1928-32, a period which included both the peak of the post-war boom and the bottom of the depression. These data, again, are compiled from the records of a single company, a large concern which operated 12 canneries in the 3 districts of Alaska during this time. In the western Alaska canneries 99 per cent of the pack was red salmon, while in the others 80 per cent were pinks and 20 per cent chums. Only the red salmon business showed a profit, according to this tabulation.

Table 18. *Average Costs and Profits (per Case) in Typical Alaska Salmon Canneries, 1928-32*

	Western Alaska ¹ (3 canneries) ²	Central Alaska (5 canneries) ²	Southeast Alaska (4 canneries)
<i>Costs</i>			
Trap fish ³	\$4.762	\$1.894	\$1.662
Bought fish ⁴	2.141	1.053	1.819
Packing cost.....	4.868	3.134	2.582
Total fish cost.....	7.918	4.583	4.254
Insurance and freight..	.325	.260	.221
Warehouse.....	.097	.100	.125
Administration.....	.644	.632	.980
Depreciation.....	.387	.368	.334
Total cost.....	9.371	5.943	5.915
<i>Selling price⁴</i>	9.943	4.860	5.090
<i>Net profit or loss</i>.....	.57	1.08 ⁶	.82 ⁵

¹ Includes one cannery on south side of Peninsula.² Average of four years.³ Average cost.⁴ The selling prices were computed on the basis of the average monthly quotation for each of the species in each of the years 1928-32.⁵ Loss.

Source: Data submitted to the authors.

XII

LABOR IN THE SALMON INDUSTRY

THE LABOR engaged in the salmon industry of the north Pacific presents a complex picture of racial types, cultural backgrounds, standards of living and technical skills. In addition, there are broad variations in working conditions in the various localities in which the industry is carried on and in methods of compensation. Rapid changes coupled with the lack of adequate statistical data, render a complete presentation difficult, but enough is known to indicate the scope and character of employment opportunities provided by the salmon fisheries, and to evaluate the stake which labor has in their maintenance.

The number of persons finding employment in the salmon industry of Alaska and the Northwest is estimated to be around 50,000. To this may be added another approximate thousand for those active in salmon fishing and processing (other than canning) in California. This substantial group of individuals, all of whom obtain at least a portion of their livelihood from salmon, may be divided into two main categories: those engaged in procuring the raw materials and those carrying on the manufacturing of the finished products. Together with the salmon fishermen who with net, line or trap draw the fish from ocean and stream, there must also be considered the transport workers who convey the raw fish to the processing plants. Throughout the discussion stress will be laid on the salmon canning industry as that provides by far the greater part of the total labor demand. The largest groups not linked primarily with salmon canning are trollers and workers in salteries.

One characteristic exists throughout. It is the dependence of employment upon the fish supply which today is strictly controlled by conservation regulation. For a good proportion of the workers the return on their labor is also dependent on the same variable. Labor hence has a considerable stake in such conservation policies as shall lead to the continuance and stabilization of the runs.

Another common factor is the seasonality of employment in the salmon industry with its resultant intensification of the industrial labor problem. The annual employment season ranges in general from three to six consecutive months centering in the summer. Employers generally prefer retaining the same men from year to year, and most of the men seek reemployment each season. During the off season a supplementary income must be sought if the salmon wage is insufficient to support the men for 12 months. Still another characteristic has only recently become so widespread as to be termed a constant in the labor situation—that is, unionization. Paralleling the nation-wide trend, workers in the salmon industry have become more articulate and better organized in pressing for higher wages and better conditions of work. Their efforts toward this end have been aided by the fact that the industry is one peculiarly vulnerable to union pressure due to its dependence on a few transportation routes.

SALMON FISHERMEN

The most important forms of gear used in salmon fishing have already been described, as well as their relative importance in the total catch (see Chapter II). The fishing methods employed are similar throughout most of the fishing areas, although some forms predominate in the various regions. However, the conditions of employment differ more widely. Alaska, by virtue of its isolation and the limited labor supply which it affords, presents conditions which are unique.

Salmon Fishing Labor in Alaska

The annual trek of fishermen, transport and cannery workers, and maintenance crews to Alaska is an outstanding feature of the labor situation on the Pacific coast. Insufficient local labor is available to man the industry, hence thousands of fishermen, transport workers and others must be brought each year from Washington, Oregon and California. These workers must be housed and fed during their temporary stay and provision made for their transportation to and from the Territory. Official statistics do not differentiate between local and imported labor, so that the actual size of the annual trek is unknown; but it may be roughly estimated that more than half of the workers come from outside.

Comparatively speaking, it may be said that the amount of resident labor employed follows the lines of Alaska's population distribution, being the highest in the most thickly inhabited region of the Territory, the southeastern district, and diminishing the further west the cannery is located. The industry, however, makes increasing use of local Alaska labor and fishermen, both white and native. It is reported that in the last few years the packers have made a definite practice of utilizing local workers to the extent that they are available, following growth of the Alaskans' demand for greater participation in the natural wealth of the Territory, a movement which is popularly referred to by the slogan "Alaska for the Alaskans."

The total number of fishermen and transport workers in all salmon fisheries of Alaska—canning, salteries, etc.—in 1937 was 12,131. Salmon canning alone in the western district accounted for 3,024, in the central district 3,096, and in the southeast district 3,947.¹ The western region is almost identical with Bristol Bay, except that it includes as well two or three canneries which are situated north of the Peninsula but not in the Bay. In considering Alaska fishermen, a logical division exists between those who work with company boats and gear and the independents, all of whom are paid on a per fish basis. The fishermen in Bristol Bay fall into the former category, to which attention will first be directed.

In the 1937 season 1,216 of the 2,485 salmon fishermen of Bristol Bay were residents of Alaska, many of whom journeyed to this district from other sections of the Territory.² The differences in the employment conditions between the resident and nonresident, however, are not great, and the Bristol Bay fishermen compose about the largest homogeneous group of salmon fishermen in Alaska. As indicated earlier (see Chapter III), government regulations restrict fishing in this region to gill nets operated from sail boats, no power boats being allowed. Moreover, all fishermen operate company gear, working on a "lay" basis which pays a piece rate and a bonus covered by a union contract. By the terms of the

¹ Compiled from Bower, *Alaska Fishery and Fur-Seal Industries*, cited, 1937, pp. 107, 112-18.

² *Alaska Salmon Fishery, Hearings before the Committee on Merchant Marine and Fisheries on H. R. 8344*. 75th Cong., 3rd sess. (Washington, 1938), p. 78.

union agreement all gill netters in Bristol Bay, unless Alaska natives, must be members of the Alaska Fishermen's Union.

Both drift and stake gill nets are in use, the former predominating. Drift nets are fished from 29-foot boats, two men to a boat. As there are only 20 to 22 days of actual fishing permitted, the men eat, sleep and live in the restricted quarters aboard, doing their own cooking, though hot food is available for them at the cannery receiving scow when they make their deliveries of fish, which they are required to do at least once every 24 hours.

Of all the salmon fishermen those in Bristol Bay, home of the valuable red salmon, command the best return on their work, many receiving as much as \$1,500 to \$3,000 for the short season's work. However, earnings vary considerably with the locality in the Bay, and the less efficient men may get as little as \$500 or \$600. Average earnings over the four or five years preceding 1937 were reported to have been \$1,200 to \$1,300.³ Payment is made on the basis of fish caught, each man in the boat being credited with the total boat's catch. In 1937 rates per fish paid to each of the two gill-net fishermen were as follows:⁴

Kings over 15 lbs.....	31 cents
Reds and cohos.....	7 1/8 cents
Chums.....	3 3/10 cents
Pinks.....	85/100 cents

In 1938 these rates by agreement were lowered seven per cent, giving a return of six and five eighths cents to each individual fisherman on the reds which compose the main part of the catch.

In addition to payments on a per-fish basis, the men each receive \$150 "run money." This originated in the days of the sailing ships when the men were expected to work the vessel transporting them from the states as well as to do a certain amount of preparatory work at the cannery and longshoring. They still do some preliminary work and longshoring for this money but overtime is paid if work exceeds a six-day, 48-hour week, and for certain types of

³ Estimates obtained from the industry.

⁴ See 1937 Agreement of the Alaska Fishermen's Union. Red fish prices in Bristol Bay from 1930, as officially reported, were in cents per boat: 1930—8½ and 9, 1931—8½ and 9, 1932—8¾ and 9, 1933—9, 1934—9¼, 1935—12½, 1936—12½, 1937—14¼, 1938—13¼. The first price mentioned applied to Naknek, the second to Nushagak. From 1933 on the prices were the same in both areas.

work additional wages are offered (1937 agreement). Food, equipment, housing, boats and gear are also provided by the company, as well as two-way transportation. In the cases where the company does not operate its own steamer this must be first-class accommodation. Each man with a family is allowed an advance of \$100 a month against his final earnings. Otherwise he receives his pay at the end of the season. Resident workers obtain the same rate of pay as the men from outside. However they only receive \$100 of the "run money" as they do not spend the same length of time in transit.

For the fishing season itself there are no hours stipulated in the fishermen's contract. Restriction on fishing exists in the form of conservation regulations imposed by the government which establish certain closed periods, and in the limit on a day's catch which the union agreement permits the cannery to impose. The purpose of the latter is to prevent temporarily oversupplying the cannery, with attendant waste. A mutual agreement among the Bristol Bay cannery adopted in cooperation with the conservation officials restricts the number of boats which a plant may operate to six and a half for each line of machinery. This represents a considerable reduction from 1917 when there were 15 boats to a line, but is partially offset by new and larger cannerys. It naturally limits the demand for fishermen but also operates to increase individual earnings.

The work season is short, varying slightly with the location of the plant. It runs from the beginning of May, when the first boat goes up, to no later than August 20, with the actual fishing confined to about four weeks. Fishermen going both to Bristol Bay and to other regions may do some lumbering or fishing in the states. Many live on small farms; others find miscellaneous jobs. No reliable study has been made of the extent to which these seasonal workers supplement their summer's earnings.

In sections of Alaska other than Bristol Bay, traps are the predominant form of company-owned gear. Since 1936 the trap men have been in the same union as the Bristol Bay gill netters and have different agreements for the various regions. Their work includes the construction of traps, acting as watchmen when the traps are in operation, brailing the fish from the traps and transporting them to the cannery on tenders. The working season is generally longer than in Bristol Bay. Payment is by the month

in the majority of instances, with an additional pro-rata payment on the basis of the number of cases packed at the employing cannery. (See Table 19.) In southeastern Alaska, however, due to the wide variation in the size of the runs and the low prices generally received for fish no pro-rata payments are made, and the monthly rates are higher.

The monthly wage of trap men is payable for nonresidents from the day of embarkation at the port in the states to the time of return to the same port. Residents are paid in accordance with the period of work, but they operate under the same wage scale as nonresidents. Minimum employment is guaranteed the migrant worker from the time of embarkation to 36 hours after the closing of the fishing season as fixed by Federal regulations, unless the cannery is destroyed or the company decides to cease operations for cause beyond control of the owner (1937 agreement). The length of the working day for trap operations and for construction work covering the period before and after the fishing seasons with provisions for overtime is agreed upon. An exception covers the tender crews and culinary workers on floating equipment. As in the case of Bristol Bay, the employing company provides food, equipment, housing and transportation from and to the states.

The length of the seasons for the fishermen varies with the locality. In the southeastern district the crews go up between the first of April and the middle of July, returning at the end of September or in October. The season in Cook Inlet runs from the middle of April to the end of August. Further west the set-up men begin to go up as early as the end of March and return in September.

The fishery workers so far described operate company-owned gill nets or traps. Canneries also own other forms of gear such as beach seines, purse seines and gill nets in regions other than Bristol Bay, and the men operating them are drawn either from the local population or from the states. In some cases unionization is local, in others the men belong to the large Alaska Fishermen's Union. Their rates of compensation and conditions of work vary with circumstances. In all cases of men brought in from the outside, employment begins and ends at the port of embarkation in the states, with transportation, housing and food provided by the employing company. The two main ports from which the fishermen sail—and this is also true for the shore workers to be con-

Table 19. *Typical Money Wage Rates per Month in Alaska, 1938*¹

(in dollars)

	Southeastern	Copper River and Prince William Sd.	Southwestern (Men "on lay") ²
Cannery Tender Crews³			
Captain.....	145-170	152-173	130-145
Engineer.....	135-156	138-159	115-130
Deck hand.....	109	112	89
Cook.....	119	121	98
Pile-Driven Crews⁴			
Foreman pile driver	170-193	173-197	152
Rigging engineer...	133-142	135-145	..
Pile-driver man....	109-119	112-121	89-119
Web man.....	109-119	112-121	89- 98
Cannery Workers			
Cannery cook (mess)	133-165	135-169	143-176
Dishwasher, waiter...	91	93	86
First foreman.....	744-930 ⁵	760-950 ⁶	760-950 ⁵
Second foreman....	163-186	166-190	176-200
Cook (Oriental crew)	112-140	114-145	124-157
Cannery operative (unskilled).....	70- 98	70-100	70-105
Machinist foreman..	1,710-2,090 ⁵	1,710-2,090 ⁵	1,710-2,090 ⁵
Machinist, first.....	950-1,140 ⁶	950-1,140 ⁶	950-1,140 ⁶
Fillerman.....	143	143	143
Seamer man.....	143	143	143
"Iron Chink" man..	143	143	143
Salmon cook.....	119	119	119
Utility helper.....	90	90	90
Apprentice.....	71	71	71
Carpenter.....	162	162	162
Radio operator.....	143	143	143
Fisherman ⁶.....	..	86	..

¹ This excludes Bristol Bay. All rates are exclusive of board, lodging and transportation which are furnished by the companies.

² Men "on lay" in the southwestern district (cannery tender and pile-driver crews) receive in addition to the wage rates named, a lay or bonus on the number of cases packed amounting to \$4.18 per 1,000 cases packed of reds and \$2.09 per 1,000 cases for all other grades. Trap web men on purse-seineboats receive \$2.09 for reds and \$1.04 for all other species. Bonuses are paid on Kodiak Island, and in Cook Inlet.

³ Rates vary with size of boat.

⁴ Rates vary with the number of traps.

⁵ Per season. Rates vary with number of machine lines in cannery.

⁶ Before and after fishing season.

Source: Fact Finding Board for the Canned Salmon Industry, *Findings of Fact and Report of the Fact Finding Board* (Seattle, 1938).

sidered later—are Seattle and San Francisco, where, as indicated earlier, the majority of the concerns have their offices and do their hiring of nonresident workers.

Independent fishermen fall usually into two general categories: purse seiners and trollers, although in some regions gill netters may also be classed as independents. The purse seiners serving the

Alaska canneries are predominantly residents of Alaska. In 1937 about 55 vessels sailed to Alaska from the Washington purse-seine fleet. These operate around the Peninsula, a few on Kodiak and some in the southeastern district. Of the resident boats the greater number operate in the southeastern district. In the Copper River region there are a number of combination gill-net and seine boats which are considerably smaller than the usual purse seiner. As already noted, the number of men per vessel in Alaska is less than in the Puget Sound fleet. The biggest Alaska seiners use no more than seven men, while many of the Alaska boats have crews considerably smaller.

Two different agreements are involved in fixing the returns to the independent purse seiners: the agreement with the canneries concerning the price of fish and a working agreement between the men and the boat owner. The purse-seine boats work under regular contract with individual cannerys. It often happens, moreover, that the vessel owner is working off payments on a boat financed by the cannery company. Prices paid by the company to the boat are on a per-unit basis. Rates in 1937 for the southeastern area were: pinks—8¢ each, chums—9½¢, reds—35¢, cohos—22½¢, kings according to size and quality. The 1938 rates were reduced to 5, 6½, 20 and 15 cents respectively, based on the selling prices of the canned product, with the possibility of a future increase depending on the selling price as of March 1939. The company is permitted by the agreement to reject fish of poor quality or condition. It may also limit the catch of each seine boat having an exclusive contract, and may cease operations at any time deemed necessary. The seiners are required to report to the cannery or tender and discharge the catch once in every 24 hours. Seiners in other areas have somewhat different agreements.

The work agreement establishes a share or "lay" method of distributing the net proceeds of the catch between the fishermen and the vessel owner. The agreements are not uniform throughout Alaska but vary with local custom. In principle they provide that from the gross returns certain costs are deducted—boat fuel, lubricating oil, stove fuel, etc. The remainder is divided into shares of which 2 ordinarily go to the boat, 2 to the seine and gear, and one to each member of the crew unless it is less than eight men. In the latter event the whole is divided into 12 shares with the boat and gear taking 4 and the remaining 8 being divided

between the men. The captain, even though he may own the boat, gets a share as a member of the crew. In addition he receives from one quarter to one half a share from the seine and from one fourth to one half share from the boat. From the men's share, food bills, etc., are deducted. In addition to fishing and running the boat, the crew is expected to care for the nets and gear and perform other ship duties.

The Alaska trolling fleet, operating mainly in connection with the fresh, frozen and mild-cure trade rather than with the canneries, is the other large group of independent fishermen. Since the Bureau of Fisheries has not completed a registration of these boats for several years, the number of fishermen engaged in trolling is not exactly known. It was estimated in 1937 at about 1,000, with around 250 hand trollers in addition. The season for salmon trollers is considerably longer than for the other types of fishing and is not subject to closure. Fishing may continue from January to December, depending on the size of the boat and the skill of the fishermen. This type of operation, moreover, does not depend upon a run of salmon but catches the individual fish which are to be found feeding offshore. Trollers are mainly deep-sea fishermen, though some trolling is done in inside waters. The Alaska fleet is composed of regular Alaska residents and also of men from the states who keep their boats in Alaska but come back to Seattle for the off months.

The catch is sold at various ports to the buyers for the wholesale houses or to the tenders sent to the fishing grounds. In 1937, for example, the Alaska prices opened at 8¢ a pound for large chinook, with 5¢ a pound for small fish; 4¢ a pound was paid for white chinooks and 3¢ a pound for silvers. By late August prices had risen to 16¢, 12½¢, 7¢ and 8¢ respectively. Compensation among the trollers is usually on the lay plan, previously described, but with minor variations.

Fishermen of the States

Turning our attention to salmon fishing in the coastal states, we find between 8,000 and 8,500 persons engaged in fishing for salmon in Washington, Oregon and California in 1937.⁵ In con-

⁵ Compiled from information supplied by the U. S. Dept. of Commerce. There were also 210 transport workers engaged in all fisheries.

sidering these, attention will be given first to the independent fishermen who are greatly in the majority. Of these the salmon purse seiners of Puget Sound form a fairly large homogeneous group which looks to purse seining as the chief means of support and is completely unionized. Salmon purse seining is confined in the states to the waters of Washington, none being carried on in Oregon or California.

The activity of this group is not limited to salmon, for some of the boats and crews go into the herring fishery while others cruise to California for the sardine catch. (The growth of the sardine fisheries has attracted many purse seiners. From the Washington purse-seine fleet of around 240, about 60 boats went south in 1937 and a much larger percentage of the crews.) Washington salmon seining has really two seasons, the summer from June to the beginning of September and the fall from September 20 to November 20. Except for participation in other fisheries such as the sardine, the men are reported to follow no single line of activity in the off months.

Often there is no formal contract between purse-seine boats and individual canneries in the states, but the boats usually have some arrangement whereby they deliver their fish to a particular cannery. Frequently, indeed, the vessel owner has had money advanced to him from the cannery concern for equipment and consequently will sell the fish to the creditor company in the discharging of the debt. There is, however, an agreement regarding rates to be paid by the companies for the seine-caught fish which is negotiated between the fishing union and the canneries. In 1937 and 1938 the payments were on a poundage basis as opposed to the former method (the one still prevalent in Alaska) of calculating on a per-unit basis. The rates for 1937 and 1938 were as follows:

	1937	1938
Sockeye.....	10 1/4¢ per lb.	7¢ per lb.; 50¢ minimum per fish
Pinks.....	2 1/4¢ per lb.	
Silvers.....	4¢ per lb. to July 10, with 25¢ minimum per fish; 4¢ per lb. after July 10, with 30¢ minimum per fish	3 1/2¢ per lb. to August 10, with 25¢ minimum per fish; 3 1/2¢ per lb. after August, with 30¢ minimum per fish
Springs.....	\$1 per fish, 15 lbs. and over; 7 to 15 lbs., same as silvers; under 7 lbs., same as pinks.	75¢ each, 14 lbs. and over; 7 to 14 lbs., 3 1/2¢ a lb.; under 7 lbs., 10¢ each.

In contrast also to the practice in Alaska there is no provision in the agreement for the canneries to establish a limit on the catch in Washington.

The trollers are another group of independent fishermen operating in the salmon fisheries of Washington, Oregon and California. They numbered around 1,900 men in 1937.⁶ The methods of work and of dividing the catch proceeds are the same here as in Alaska. There is some variation, however, in the method of disposing of the catch. In some cases this is done through a cooperative organization, which sells the fish on the exchange and credits each troller member of the cooperative with the sale price of the amount of fish he delivers minus certain service charges.

Another method of disposing of the catch is practiced by the trollers who belong to a union. In this case agreements are made with the individual concerns interested in obtaining troll-caught fish and a definite scale of prices is determined for the whole season. In 1937, for example, the Columbia River companies agreed to pay a minimum price of 13¢ a pound on chinooks, 14 pounds and over, 7¢ a pound on chinooks 26 inches long up to 14 pounds and also on silversides. On the Oregon coast the rates were slightly lower.

A new development for the trolling fleet of the Northwest is the sudden rise of an albacore (tuna) fishery off the Oregon and Washington coast. The run coincides with the heavy period of salmon packing, so that neither packers nor fishermen are able to reap full advantage from this new source of income. Moreover the development is still too new for the industry to have been properly organized. Freezing the tuna for canning later may be the solution. Reports of the 1938 season indicate nevertheless that a portion of the trolling fleet was being diverted from salmon to albacore.

Gill netters are the largest group of fishermen engaged in catching salmon in the rivers of Washington, Oregon and California. Statistics do not indicate in every instance those who are primarily engaged in fishing for salmon rather than for other species of fish. It may be estimated, however, that around 3,500 men were so occupied in 1937. Part of this number are independent fishermen

⁶ Compiled from information supplied by the U. S. Dept. of Commerce.

who fall under the jurisdiction of the trollers' union, which negotiates with the companies on the prices to be paid for fish.

Fishermen operating company-owned gear in the states are mainly confined to gill-net fishermen on the Columbia River where canning activities are concentrated. These men are organized, and the union rates in 1937 were as follows: chinooks and bluebacks: 12¢ per pound from April 26 to August 1; 8¢ to August 10; 6¢ to August 25; steelhead: 6¢ from June 19 to the end of the season. The 1938 rates were about the same.

There are certain obvious differences between the status of Alaska salmon fishermen and that of the men in the states. The latter are not so closely tied to the canning concerns as are the former, nor do they participate in the great northern trek which takes place each spring; their fishing is carried on nearer home. Perhaps the most important distinction, however, is the difference in the size of catch per unit of effort in the two localities. In 1937 the total salmon catch in Washington, Oregon and California was 95,661,000 pounds, with an estimated value of \$5,428,000. As already indicated, between 8,000 and 8,500 fishermen shared in this catch. In the same year, 9,998 fishermen (including trapmen) in Alaska brought in a catch of 593,384,000 pounds valued at \$11,876,000, indicating a much higher per capita output. Yet the length of the fishing season tends if anything to favor the state fishermen. Since traps are common in Alaska and are now non-existent in Washington and are moreover a form of gear noted for their efficiency, it is of interest to note the employment and salmon catch in Washington in 1934, last year of trap operation. Even then we find that it required about 5,000 men to catch nearly 64,000,000 pounds of salmon.⁷ In this list are to be found the troller fishermen using hook-and-line technique.

Undeniably there are greater salmon runs in Alaska than in the states, which in itself guarantees a greater return per unit of fishing effort. Fish runs in Washington have become seriously depleted from overfishing and from the spoiling of spawning streams by pollution and industrial obstructions. The remoteness of Alaska, the scarcity of its working population, and the greater

⁷ Figures for the states compiled from U. S. Dept. of Commerce, Bureau of Fisheries, *Statistical Bulletin* no. 1228, for 1937; 1934 figures compiled from Fiedler, *Fishery Industries of the United States*, cited, 1935. Figures for Alaska for 1937 from Bower, cited, 1937, and *Statistical Bulletin* no. 1285.

role of the canneries in organizing and controlling fishing operations all encourage the use of techniques which economize labor and thus increase per capita output.

Canadian fishermen, like the American, are divided between company employees and independents. The fishery statistics do not distinguish between the men working in the salmon fisheries and those engaged in other fisheries, but some idea of the numbers employed in this industry may be gained from the statistics on licenses, since all men in the fishing boats must be licensed. In 1937 there were 6,096 salmon gill-net licenses issued, and 952 licenses for assistants in salmon gill-net boats. Licenses numbering 3,162 were issued to trollers, 291 to purse seiners, 166 to captains of salmon purse-seine boats and 1,666 to assistants in salmon seiners. There were also 9 drag-seine licenses and 5 trap licenses.⁸ Excluding the last two forms of gear the total of the other licenses amounts to 12,842. Obviously, however, there is some duplication, since the total number of British Columbia fishermen and transport workers in the same year amounted to only 11,184. (See p. 17.) As can be seen, gill-net fishing is the dominant form. The 1937 salmon catch in this region amounted to 169,200,000 pounds.⁹

Fishing is accompanied by certain risks which fishermen must bear. First of all there is a certain mortality risk inherent in the occupation, some fatalities from drowning occurring each year. In addition there are economic risks, including not only the uncertainties of the market, but also the danger of a supply shortage due to natural causes or government regulation. The salmon runs of a particular year may be unusually small with consequent small earnings. Or, the supply may be progressively curtailed due to the depletion of the reserves by excessive fishing. Again, conservation regulations restricting fishing, the number of locations and the length of seasons have their effect on the annual fishery yield. An extreme instance occurred in Bristol Bay in 1935 when official closure of the district, although announced in advance, deprived hundreds of fishermen of their customary employment during that year.

Another aspect of a fishery with controlled yield is that an

⁸ Canada, *Eighth Annual Report of the Department of Fisheries, 1937-38*, cited, p. 88.

⁹ *Ibid.*, p. 11.

increase in the number of persons fishing reduces the return to the individual. This may also be true of an uncontrolled fishery, even though the decrease in return may be postponed for years until the fishery is seriously depleted. In salmon fishing, particularly in Alaska, this intensity of fishing is carefully watched by the Bureau of Fisheries in order to prevent depletion; and gear restrictions and closed seasons are employed when necessary. The fishermen have a stake not only in conservation but also in preventing fishermen from another country entering the salmon fishery. If this should happen and if the total catch were still restricted in the interest of conservation, the share of the American workers would be decreased to the extent of the foreign fishing. Whereas American fishermen accept the conservation limitations when they expect to profit in the long run therefrom, they would be likely to break free from any restraint applicable to themselves and not to the outside element. As the experience of the past two years shows, they are quick to join forces with the cannery workers and others in opposing the encroachment of foreign companies on the American salmon reserves.

The seasonal nature of the salmon fisheries constitutes an important element of economic insecurity for many fishermen. It means either a long period of idleness or a dovetailing of seasonal occupation. No detailed analysis has been made of the seasonal unemployment of the Pacific coast fishermen. A recent study of seasonal unemployment in the state of Washington, however, concludes that "practically all persons working in the fishing industry are unemployed during a large part of the year."¹⁰ It should be noted that this conclusion refers only to the state of Washington, and does not deny the possibility of a certain amount of part-time employment.

These various hazards arising from the nature of their employment have naturally led the fishermen to demand a rate of return which will compensate for such risks and uncertainties. The unions have been an important instrument in the endeavor to secure higher wages, and accordingly a consideration of the earnings of the fishermen will be reserved for treatment in connection with unionization.

¹⁰ William S. Hopkins, *Seasonal Unemployment in the State of Washington* (Seattle, Washington, 1936), p. 124.

SHORE WORKERS

Shore labor connected with salmon cannery, which engaged by far the greatest number of employees, has the same general feature of seasonality as has fishing. For the Alaska canneries large numbers of workers are brought in from the states while others are drawn from the local population. Many of the attendant problems are thus the same, while others differ in accordance with the characteristics of cannery workers and of the canning process.

Shore workers may be divided into two groups: those connected with the canning operations, and those engaged in maintenance work, machinists, carpenters, etc. Originally cannery labor was largely Chinese, in conformance with the general practice on the Pacific coast during the last half of the nineteenth century of utilizing cheap Oriental labor for manual work. The effect of the Chinese exclusion act, however, was to cut down the opportunities for renewing this supply. Japanese and Filipino labor then came to take its place. Subsequent restrictions on Japanese immigration in turn limited this supply and today Filipinos predominate among the Oriental workers.

The racial composition of the shore labor in 1937 was as follows:¹¹

	Southeast Alaska	Central Alaska	Western Alaska	Total
Shoresmen:				
Whites.....	2,503	1,543	1,816	5,862
Natives.....	1,760	801	194	2,755
Chinese.....	88	160	299	547
Japanese.....	534	251	154	939
Filipinos.....	1,569	1,109	1,126	3,804
Mexicans.....	13	68	548	629
Puerto Ricans.....	..	11	79	90
Kanakas.....	4	2	8	14
Negroes.....	6	16	52	74
Miscellaneous.....	1	31	52	84
 Total.....	 6,478	 3,992	 4,328	 14,798

As can be seen, the majority of these workers are nonwhite. The Alaska natives (Indian or Eskimo) comprise a little less than one fifth of the total number. About 6,000 of the total 14,798 represent migratory workers, most of them of Oriental and Latin-

¹¹ Bower, cited, 1937, p. 107.

American extraction. These men, often with no family ties and with a lower standard of living than the average American citizen, represent the unskilled labor which goes up to the canneries from the states. They form part of the large group of migratory workers found in the Pacific coast food industries. The majority of them return to the canneries season after season, being occupied in the winter months with farming, culinary work, building service jobs, etc.

Of the 5,862 white workers a certain proportion are Alaska residents also employed in unskilled cannery work. As stated earlier in the discussion of the fishing labor, the number of Alaska residents employed, both white and native, depends on the size of the population in the vicinity of the canneries and is highest in the southeastern district of the Territory. The rest of the white labor is composed of the skilled workers—maintenance men, radio operators, bookkeepers, superintendents, etc.—and a small number of nonresident white unskilled workers.

In the past one of the outstanding features of the labor hiring methods of Alaska packers was the contractor system. This system originated among the Chinese, due in part to language difficulties, and was extended to the other nationalities. The contractor made an agreement with the cannery owner to put up the pack by arranging for a definite price per case under a guarantee that the pack should be of a certain minimum size. The company furnished transportation for the labor and provided living quarters, fuel and salt. The provisioning of the men was done by the contractor, and it was with him that they had their agreement.

As can readily be imagined, the system was open to much abuse. The contractor might abscond, leaving the men with no redress. The food supplies might be unsatisfactory. The men might be misled as to the terms on which they were engaged and what they might expect to gain from the season's work. There were numerous possibilities for an unscrupulous contractor to fleece the men; for example, by providing them with equipment at exorbitant rates, selling them unnecessary goods at high prices, encouraging gambling, etc. Abuses of the contractor system were a cause of great dissatisfaction among the workers. Certainly it was not conducive to high morale nor to the cooperative spirit which is the objective of enlightened labor policy, and there was a growing

realization of this fact on all sides. Contributing to the elimination of this system were: unionization, the N.R.A. code of 1934, and the case of the People of the State of California vs. Mayer, Young and Lopez—the clothing store where the contracting operations in San Francisco were centralized. Unionization began technically in 1933 although it was of little significance that year, and for several years thereafter elements of the contractor system were continued in the union. By 1937, however, all traces of the system could be said to have disappeared.¹²

In the 1937 union agreement covering cannery workers going to Alaska from the states there were provisions apparently designed specifically to prevent recurrence of several of the evils previously existing. The union went on record as being opposed to gambling, as well as to the use of narcotics and the "excessive use of intoxicating liquors"; and the company and the union pledged their cooperation to the union delegate in getting rid of such practices. Again, a limit was placed on the amount of credit which could be granted to employees at the company's commissaries. Further, it was stipulated that "the Company shall not deduct from any wages due, any amount for gambling debts incurred by employee member, or for narcotics, drugs, or intoxicating liquor, or any employment fee, direct or indirect." The selection of employees is done by a company representative from lists furnished by the union, preference being given to former workers in the Alaska salmon industry who are members of the union. Provision is made for bringing charges against a cannery foreman who uses his position to exploit his men for personal gain.

Payment for work, according to the 1937 agreement, is on a monthly basis, the time of the trip to and from Alaska being included in the employment period. The company furnishes two-way transportation, medical care, food, lodging and any particular equipment necessary. An eight-hour day and a six-day week is established, with any additional work calling for overtime. Two months' minimum wages are guaranteed. The 1938 wage schedule

¹² For information on the working of the contractor system, see U. S. National Recovery Administration, Hearings on the Codes of Fair Competition, Hearing no. 74, *Canned Salmon* (Washington, 1934). Cf. also Cobb, *Pacific Salmon Fisheries*, cited, pp. 500-502, and L. W. Casaday, *Labor Unrest and the Labor Movement in the Salmon Industry of the Pacific Coast* (unpublished).

for Alaska districts other than Bristol Bay is given in Table 19. The great majority of the labor we have been considering falls into the category given in this table as "cannery operatives." The Bristol Bay 1938 rate in money for this group was \$73 to \$107 per month.

Conditions of cannery work in the states are naturally different from those in Alaska. Payment is on an hourly basis; the company is not responsible for food or housing; and a term of employment is not guaranteed. The workers are mainly white, as already stated, and a good proportion of them are women. Women also work in the Alaska canneries but they are residents of the Territory. The migrating workers consist entirely of men. According to union figures, there were approximately 500 workers in the salmon canneries of Puget Sound in 1937 and around 700 in those on the Columbia River.

Maintenance Men and Other Workers

Maintenance men for the canneries of Alaska come largely from the states. They are whites, and are often highly skilled. In the case of the machinists, a number of those going to Alaska are hired by the can companies in the winter season; in the summer they go to those canneries to which the can company rents machines. Others engage in various kinds of work during the winter months, and others, again, remain idle. Carpenters, on the other hand, find fairly steady employment in the off-season by work in shipbuilding and ship-repair on the Seattle and San Francisco waterfronts. According to estimates, workers of this type in the Alaska canneries number around 1,500. The wage rates are substantially higher than in the United States for similar work. The maintenance crew in the canneries of the states does not ordinarily include such skilled labor. If a machine needs repair it can be sent away to be fixed, whereas in Alaska the cannery has to be a self-sufficient unit.

Other categories of employees include office workers such as bookkeepers, who usually hold year-round jobs and return to the company's home office after the close of the cannery season. There are also superintendents, general foremen and radio men, the first-named of which, at least, are year-round employees. This group of workers not actually employed in the process of canning

numbers about 18 persons per cannery. As many as 70 to 90 per cent of these go up from the states. The 1938 wage rates for this group in the various Alaska regions except Bristol Bay is given in Table 19. The Bristol Bay rates were somewhat higher.

The length of the season for all cannery labor varies with the locality and the length of the run of fish. In the case of labor engaged in the canning process the length of the season is shorter than for the outside crews, as little preparatory work is necessary. When cans are made in Alaska all the fishermen and shoresmen go up together, as this can-making process is longer than the more usual one of simply reforming the cans. Also, in the case of the companies owning their own transport boats everyone makes the journey at one time. Otherwise the labor can go up as needed on the regular steamship lines.

In summary, the broad category of salmon workers include such diverse types as fishermen operating their own or company gear, transport workers, unskilled cannery labor and various skilled workers like machinists, carpenters, radio operators. Just as diverse are the racial types—for example, the Scandinavians who predominate among the fishermen going to Alaska from the states, the Slavonians who compose the Washington purse-seining fleet, the Alaska native—Indian and Eskimo—and the Oriental and Mexican cannery operatives. All of them are faced with the problems involved in seasonal employment; all of them have an interest in the perpetuation and stabilization of the salmon runs. Here, as elsewhere, too, the advantages of collective bargaining has resulted in drawing together the various types of workers into labor organizations. A comparatively new phenomenon in most branches of the industry, unionization has recently progressed to the point where it includes the great majority of salmon workers.

UNIONIZATION IN THE SALMON INDUSTRY

Labor organization extends to all types of workers—fishermen, cannery workers, maintenance men and radio operators. It exists in the states, in British Columbia, and in Alaska, where in addition to unionization under the jurisdiction of coast unions there are a growing number of local labor organizations; canners who decide to use predominantly Alaska labor in response to the "Alaska for Alaskans" demand and also in order to escape from

the restrictions of state labor organizations often find that a local Alaskan union has also been formed.

The increased strength and activity of labor organizations in recent years has not of course been confined to the fishing industries nor yet to the West Coast. Unionization of salmon labor has paralleled a similar movement elsewhere, but has been attended with considerably more success than in many fields.

Among the contributing factors tending to strengthen the unions have been the enactment of the National Industrial Recovery Act, the National Labor Relations Act and the growth of the powerful Maritime Federation and its affiliated groups. An important source of power possessed by many of the fishery unions lies in the dependence of the salmon packer on marine transportation for the hauling of supplies and workers from only three or four ports to the field of operations. The fact that any one of the several unions may threaten to cut off water shipments has put in their hands an implicit bargaining power which has been availed of in recent years. The industry has been completely unionized and the indications are that this may become a permanent part of the industrial structure.

It is easy to recognize, moreover, that in this industry there are special factors which have intensified the general desire of labor to bargain collectively over wages and conditions of work. Salmon workers have a special problem of economic insecurity. The uncertainty of salmon runs, the seasonality of employment, the isolation and geographical dispersion of many of the canneries as a factor in labor relations, and the abuses inherent in the old contractor system have all argued the need for unionization from the worker's point of view.

The unions themselves present a shifting picture, with changing jurisdictions and organizations. One of them—the Alaska Fishermen's Union, founded in 1902—claims the distinction of being the oldest fishermen's union to have functioned continuously to date, but the majority of unions in the fisheries industries are of comparatively recent origin. Among cannery workers unionization began in 1933, while the maintenance men were organized as recently as 1937. There are periodic shifts in jurisdiction over resident workers in Alaska with disputes between the coast and local unions. Without detailing all the ramifications of the unions

with their conflicting jurisdictions and organizational changes, we shall outline several outstanding features of this significant development.

Two general trends are apparent to the observer. One is a growing tendency toward consolidation among the different unions, although at the same time there has been serious jurisdictional controversy. Within the last two years the Salmon Purse Seiners' Union of the Pacific, to which the Puget Sound purse seiners belong, has united with the Herring Fishermen's Union and the Deep Sea and Purse Seine Fishermen's Union to form the United Fishermen of the Pacific. This merger facilitates the frequent transfer of the purse seiners from fishing for salmon to fishing for herring or sardine. Again a Federated Fishermen's Council has been formed with a number of the fishermen's unions as members. The functions of this organization include attempts to coordinate negotiations on the fish prices to be paid fishermen as well as cooperation on legislative matters and other questions of mutual interest.

Another movement has been the successful incursion of the Congress of Industrial Organizations (formerly the Committee for Industrial Organization) among the cannery labor and fishermen's groups. At a meeting of the Federated Fishermen's Council in 1938, it was decided that the component unions should have their members vote on the question of affiliation with the C.I.O. Subsequently the most powerful union in Alaska fishing, the Alaska Fishermen's Union, voted for such affiliation, as had already the joint purse-seiners' union previously described. Other fishing unions have also voted C.I.O. In December of 1938 a convention of the Federated Fishermen's Council, representing more than 20,000 fishermen, decided to accept a C.I.O. charter as the International Fishermen and Allied Workers of America, conditional on further balloting by members of the unions in the Federation. This charter has been generally accepted.

The union for cannery workers was reorganized on an industrial basis in 1937 as Local No. 1, North West District, of the United Cannery, Agricultural, Packing and Allied Workers of America and affiliated with the C.I.O., although a serious jurisdictional dispute arose with the American Federation of Labor in 1938 which delayed the operations of the fishing season. Many

of the unions, including that of the cannery workers, are affiliated locally with the Maritime Federation of the Pacific (predominantly C.I.O.), which is in a position to give them powerful support. Thus the C.I.O. has acquired considerable strength in the salmon industry. Recent developments seem to indicate that the A.F.L. is recovering some of its lost ground, however. The struggle between these two labor groups has potentialities for a serious industrial tie-up resulting from jurisdictional disputes and the action of the affiliated unions on either side.

Tie-ups have usually come over the pre-season negotiations regarding wages, fish prices, etc., and these may sometimes be so protracted that they interfere with the season's opening. Such was the case in 1938. The fundamental conflict between the labor groups and the employers complicated by jurisdictional dispute between the A.F.L. and the C.I.O. resulted in a deadlock which at one time seemed to threaten the whole season's fishing. The employer-worker conflict centered primarily on wages and earnings, which we shall now analyze briefly.

Industrial and Wage Disputes

It was generally true throughout the salmon industry that labor's remuneration in 1937 was at a higher level than at any previous time since the World War except for 1918-19. In the Alaska salmon canneries the 14,798 shoresmen received a total wage of \$5,582,710¹³ making an average return of \$377 in addition to food, lodging, transportation, etc., for the season's work. However, the considerable discrepancy between the wages for skilled and unskilled workers observable in Table 19 must be borne in mind in this connection. Foremen, machinists, carpenters, radio men received considerably more than the above amount, while the average wage for the general cannery workers who compose the majority of the 14,798 was somewhat less.

The 2,114 transport workers—captains, engineers, crew and cooks aboard the cannery tenders—received an aggregate amount of \$1,270,241 in 1937,¹⁴ making an average season's return of \$601. The estimated value to the fishermen of the 1937 catch was \$11,876,351.¹⁵ In that year 9,998 fishermen were engaged in catch-

¹³ Bower, cited, 1937, p. 107.

¹⁴ *Ibid.*

¹⁵ *Statistical Bulletin*, cited, no. 1285.

ing salmon in all branches of the Alaska salmon industry, making an average return on the basis of the estimated value already given of \$1,188.

It must be remembered, however, that in the case of independent fishermen the costs of operating the boat have to be deducted from the return on the fish before the real return to the fishermen may be ascertained. When the earnings of the fishermen in the Alaska salmon canneries were analyzed in a study of fishermen's earnings made for the National Recovery Administration, it was found that the fishermen's compensation came to about 44 per cent of the estimated value of the raw fish supply in 1934.¹⁰ The same study gave the average 1934 earnings of company fishermen, excluding trapmen, as around \$750, of the trapmen about \$400, and of the independent fishermen \$335, all in addition to food and lodging. The data on employee fishermen were more complete than for the independents. The latter also included some material on earnings in the states. Since 1934 a substantial increase in fishermen's earnings is known to have taken place, but statistical information on recent years is not available.

Prior to 1938 wage increases were facilitated by the business upswing which the industry was enjoying. Sales of canned salmon fell off, however, in the winter of 1937-38, prices declined drastically, and the packers faced the 1938 season with a substantial carry-over from the previous pack. In this situation there was considerable pressure to reduce labor costs. As a result negotiations on the labor agreements for the 1938 season brought a sharp conflict between capital and labor. The unions, possibly as a bargaining move, demanded increases over the 1937 wage rates, while the employers on the other hand insisted on reductions averaging 15 per cent of the 1937 rates.

The background of this wage dispute included a pronounced drop in wage rates through the years of the depression followed by substantial increases in the recovery years. Actual wage rates for the industry as a whole over long periods of time are not available, since the Territory of Alaska does not require the filing of wage scales for workmen's compensation or taxing pur-

¹⁰ John R. Arnold, *Earnings of Fishermen and of Fishing Craft*, Appendix to *The Fishery Industry and the Fishery Codes*, Office of National Recovery Administration, Division of Review, Work Materials no. 31 (Washington, 1936), p. 127.

poses. Some information can be obtained, however, from sample data.

In the case of 12 typical canneries, with identical classifications, operating in all Alaska districts, there was an increase of 21.3 per cent in wage costs from 1929 to 1937. Several packers have expressed the belief that these rates were generally typical throughout much of the industry. This would indicate that the 1937 wage scales were about one fifth higher than immediately before the depression, although it is not to be assumed thereby that labor costs were correspondingly raised.

Comparative data are available, however, to show that the 1937 labor costs per case in 10 southeastern and central Alaska canneries were considerably higher than those of the preceding year. These canneries fall into a natural two-fold division—four in one group and six in the other. Among the various categories of workers in these two groups, the increases ranged from 30.0 per cent to 125.1 per cent. For the first group of four canneries, the increase of the total labor cost per case between 1936 and 1937 was 65.9 per cent and for the other six canneries 78.5 per cent.

This increase cannot be attributed solely to increased wages. The shrinkage in the size of the pack must also be considered. Actually there was a noticeable decrease in the 1937 output—1936 had been a peak year. If the total 1937 labor outlay is applied against the 1936 pack, the increases in labor costs per case drop from 65.9 and 78.5 per cent already cited to 42.6 and 31.3 per cent. In other words, according to this calculation, even if the 1937 pack had equalled that of 1936 in size, labor costs per case would still have been much higher to the canneryman owing to increased wage rates, added food and transportation costs, changes in production efficiency, etc.

Faced with this situation the packers desired to reduce the 1938 packing costs by lowering wage rates. After long dispute the majority of the Bristol Bay workers finally accepted a seven per cent cut from the 1937 rates, following a threat to abandon the season on the part of one of the largest packers. The workers in the other districts and the Bristol Bay machinists from Seattle agreed to open the season on the basis of provisional rates, representing reductions from those of 1937 ranging from 10 to 37.5 per cent and averaging 15 per cent. It was agreed that a fact-finding

board be formed which should make extensive investigations and give a final determination of wage scales by the end of the season. The board was composed of one representative of the employers, one of labor, and an appointee of a member of the U. S. Circuit Court of Appeals in San Francisco. "The board was given power to determine what if any portion of the decrease in pay should be restored to the workers, or whether an increase up to 10% above the 1937 scales or any part thereof was justified."¹⁷

The Fact Finding Board ultimately restored the 1937 wage rate for the Bristol Bay machinists, and for the machinists, carpenters and radio men of all other districts set the figure at five per cent below 1937 rates. The wages of the fishermen and cannery workers in all districts except the southeastern were also restored to five per cent below 1937. For the southeastern district a cut of seven per cent was awarded. Classified Orientals were not cut below the 1937 level. It should be noted that among Bristol Bay workers only the machinists were parties to this agreement, the others opened the season on definite reductions of seven per cent not subject to further change. Table 19 shows the wage rates ultimately determined by the Fact Finding Board.

As can be seen, this decision represented a compromise. For most of the workers it meant a cut in wages as compared with 1937, but the reduction was considerably less than what the packers had demanded. The representative of both parties to the dispute went on record in the Board's report as dissatisfied with the ultimate decision. Many packers report losses on the 1938 season and court litigation has resulted from the refusal of several companies to meet claims made by employees under the Board's decision. In April, 1939, the Superior Court of the State of Washington rendered a decision favorable to the canners of the Cordova district, holding that the Board had failed to take adequate account of local conditions and differentials.

The 1938 controversy has been recounted in some detail, partly because it indicates the growing strength of organized labor to resist wage cuts in the salmon industry by concerted action. How this will react on the packers is as yet a question for surmise. The industry is now completely unionized, as regards both outside and inside crews, which in turn suggests the possibility of a new era

¹⁷ *Findings of Fact and Report of the Fact Finding Board*, cited.

of higher labor costs. For the packers possible relief from the cost increases in the past few years, to which the rising price of operating materials has contributed as well as increased labor rates, may appear in the future in the form of greater speeds in inside cannery operations and in a greater concentration of supply from improved water transportation. It may also be expected that the salmon packers will respond to labor organization with consolidations of existing companies and plants in order to secure operating and distribution economies. If smaller marginal companies are eliminated, this may result in a certain amount of labor displacement.

By unionization, nevertheless, the salmon workers have been able to strengthen their bargaining position in the industry. On the other hand, as regards their dependence on the salmon runs in determining employment opportunities they have no power of control but must trust to the conservation policies of the state and national governments. It is worthwhile briefly to consider at this point the possible effects on labor of an invasion of the salmon runs by foreign competition or a reduction of employment opportunities resulting from depletion or any other cause.

The readjustment consequent on such a dislocation would not be easy for those involved. In the first instance, men working on piece rates would naturally suffer more than those paid on a monthly or day-rate basis. Over a longer period of time standards of living would be lowered, as many fishermen and transport workers undoubtedly would be forced out of employment. It is doubtful whether dispersion and competition among fishermen would proceed at many levels. The gill netter who has been a "netter" most of his life would tend to stay in this general craft level and would compete in the limited number of districts where this type of gear was used. South of Bristol Bay the opportunities are restricted in Alaska, and in the coastal states the most important gill net area is on the Columbia River.

Purse seiners, if displaced by outsiders, would tend to readjust along craft lines, thus forcing competition in other purse-seine districts and other seine fisheries. There might also be some competition between them and the crew members, transport workers (cannery tender operators) and trapmen. Few fishermen would enter the canneries, working in competition with the Oriental or

the mechanical crews. Racial and craft differences apparently are too strongly fixed to allow any great infiltration, but the inside workers would be faced with a lowered demand for their labor. The determined opposition of labor groups to any foreign encroachment on the salmon fisheries threatening such dislocation was strongly evidenced in the summer of 1937 when Japanese exploitation of the Bristol Bay salmon runs seemed a possibility. (See Chapter XVI.)

XIII

THE NORTH PACIFIC HALIBUT FISHERY

THE HALIBUT fishery of the north Pacific has a significance entirely disproportionate to its economic importance. The size of the catch is small compared with that of the great salmon fisheries taken as a whole. Its value—slightly over three million dollars for the United States Pacific landings in 1937—is only of moderate significance considered in terms of the total fisheries either of the United States or of Alaska and the Pacific coast states. The same is true of halibut in relation to the Canadian fisheries. For both Canada and the United States combined it affords employment to less than 2,500 fishermen. Nevertheless, it is the most important of the fisheries of the Pacific Northwest other than salmon, and it takes first place as an outstanding example of conservation work not only on the American continent but throughout the world.

The halibut reserves of this region are now by a considerable margin the greatest in the world for this fish species. In the past they have suffered serious depletion as a result of overfishing, but they are now being operated under strict conservation regulations which are slowly but surely rehabilitating the fishery. The form of control which has been evolved is a joint one between the United States and Canada, and represents a pioneer effort in the field of international conservation regulation. Authority in preserving the halibut fishery is vested in the International Fisheries Commission,¹ constituted by treaty between the two countries. Its record is a distinguished one deserving of careful study, for it points the way to a rational solution of fishery problems in many parts of the world.

¹ The Commission is the source for authoritative information on the scientific aspects of this fishery, and from its reports much of the data for this chapter has been drawn. For a short discussion of its powers and duties, see Edward W. Allen, *The Halibut Commission, Its Legal Powers and Functions*, International Fisheries Commission, Circular no. 1 (Seattle, Washington, 1936).

PHYSICAL ASPECTS OF THE HALIBUT FISHERY

Before considering the all-important conservation work, a brief review of the biology of the fish and the processes entailed in bringing the halibut to the ultimate consumer is necessary to give the reader some familiarity with the factors involved in the fishery and hence in the conservation program. Basic to any understanding is some knowledge of the physical aspects of the fish itself, which differ markedly from those of salmon. In view of the preponderance of the American over the Canadian halibut catch (see below) attention is concentrated on the American fishery throughout our discussion.

Biological Background

Halibut, largest of the flatfish family, inhabit the waters of the continental shelf and are not anadromous as are the salmon. One factor determining their location is the bottom temperature of the sea. It has been established that halibut are found where the range lies between three and eight degrees centigrade, with the occurrence of the fish diminishing in frequency at the two extremes. Distribution of halibut along the American shore of the Pacific is greater than along the Asiatic shore, owing to the temperate ocean currents which pass along the whole North American coast. On the Asiatic coast the contact of warm ocean currents with those from the Arctic has been found to produce, in the rather abrupt transition area, the temperature conducive to the existence of halibut. Only a limited area off northern Japan, where these conditions prevail, is productive. Off the west coast of the American continent halibut are found from California to a point north of the Alaska Peninsula.²

Reaching maturity at an average age of 12 years, halibut lay their eggs at the edge of the fishing banks. Both eggs and larvae are found drifting in the intermediate levels of water off the continental shelf, but after four or five months they rise into higher levels and gradually are carried inshore to shallow water. Particular attention has been paid to the movements of the halibut

² Compare William F. Thompson and Richard Van Cleve, *Life History of the Pacific Halibut (2) Distribution and Early Life History*, International Fisheries Commission, Report no. 9 (Seattle, Washington, 1934).

in their early stages of development in order to determine what interrelation there may be between the distinct stocks of fish found in the different sections of the American banks. Marking experiments on the mature fish have shown that the western and southern fisheries are now biologically nearly separate so far as the commercial sizes are concerned.³

The two main divisions of the halibut fishing grounds used by the International Fisheries Commission are the western grounds, known as Area Three, stretching from Cape Spencer west along the Alaska Peninsula, and the southern grounds, or Area Two, south of Cape Spencer.⁴ Investigation of the eggs and larvae has established the fact that those of the western area do not drift southward. In the southern area spawning has been so reduced that it has not been feasible to investigate the details of distribution.

The female halibut sometimes reaches 300 pounds in weight. The male, however, is consistently smaller and rarely is found larger than 40 pounds. Fish enter the commercial catch at 4 years of age, when the weight according to samples taken in one section of the southern grounds averages slightly over 4 pounds. In the same section the average weight of a 12-year old or mature fish is 18 pounds and of a 15-year old one more than 30 pounds. The maximum age of halibut is 35 to 40 years, but in the present condition of the banks it is believed that few reach that maximum.

Fishing Techniques

Halibut are bottom fish but they are active and are frequently seen near the surface. Moreover, the bottom which they inhabit is not always smooth and even. These facts have conditioned the method used in the fishery. On the Pacific coast the gear used is a ground line with hooks attached at stated intervals, which is payed out from the vessel or boat and allowed to "set" on the bottom. There have been two types of fishing crafts used: the dory vessel, which has virtually disappeared of late and is now prohibited, and the long-line vessel. Dories are small boats, flat-

³ William F. Thompson and William C. Herrington, *Life History of the Pacific Halibut (1) Marking Experiments*, International Fisheries Commission, Report no. 2 (Victoria, B. C., 1930), p. 16.

⁴ Details of the area divisions are contained in the Regulations issued by the Commission.

bottomed, which can be stacked upon the deck of a vessel. In this type of fishing the larger vessel sailed to the fishing ground where it launched the dories for each fishing operation. These were manned by two fishermen who set gear from the small boat. In the case of the long-line vessel the gear is set from the deck, being payed out over a chute in the stern; later it is hauled in with the catch by a power gurdy over a roller on the side. The advantage of fishing from the main vessel is that the operations of setting and hauling can be done by mechanical methods. This type of fishing also results in more comfort and safety for the fisherman, although it is possible that the dory fishing was easier for older men as they were not driven by the speed of the winch.

The unit of gear as now used is the six-line skate. A line is a 50-fathom length of ground line with hooks attached at intervals of 13 feet. Six of these lines are attached to form a skate, several of which may be again fastened together to form what is known as a string. The strings are anchored at each end, and if very long, at several places in between. Attached to each anchor is a buoy keg floating on the surface with a flag buoy to indicate its position. A vessel usually puts out three or four such strings of gear. The hooks are baited with fresh or frozen herring, depending on what is obtainable.

When caught the fish is cleaned, filled with crushed ice and packed in ice for preservation until the vessel reaches port, where it is sold to wholesale dealers in fresh and frozen fish. Since the development of halibut-liver oil as a source of vitamins, livers of the fish are removed at the time of cleaning and stored in cans until arrival at port, where they are sold under contract to large pharmaceutical houses. The viscera are also retained and marketed, having been found recently to yield a good grade of oil.

The regular American halibut fleet in 1938 was composed of approximately 220 boats and vessels. This did not include those boats primarily engaged in catching other kinds of fish, but which brought in a subsidiary catch of halibut amounting to less than 1,000 pounds to a landing. Practically all the boats today are equipped with Diesel engines and vary in size from around 5 tons (net) to 70 tons. An apparent trend in vessel development is toward the building of combination boats—i.e. vessels which can be adapted to other types of fishing such as pilchard, herring and

salmon. Some of the fleet go into other fishing after making a few trips for halibut.

Labor and the Lay Method of Compensation

In operating the boat, the owner is usually master. In the case of dual ownership, one owner may take some other position in the boat such as engineer. The size of crew naturally varies with the size of the boat. In near-by fishing grounds where the smaller boats operate, the number of men to a boat is reported to vary from 2 to 10 with an average of 5. In the more distant areas there is a 10-man average with the numbers ranging from 5 to 11.

The American halibut fishermen belong to the Deep-Sea Fishermen's Union of the Pacific which was organized in 1912. The owners likewise have their own organization, the Fishing Vessel Owners Association, which includes about 85 per cent of the fleet. The number of men engaged in the American Pacific halibut fishery in 1938 was 1,822. For the same year the man power of the Canadian Pacific halibut fleet was 686.⁵ Table 20 gives the government statistics on United States operating units in halibut fishing.

The method of compensation in the American halibut fishery is the lay or share system, by which the fishermen do not receive regular wages but a carefully worked out proportion of the catch value. From each trip's gross earnings certain small charges are subtracted for lost gear, customs, inspection and insurance. One fifth of the resultant amount is then deducted as the boat's share, going to the owner or owners of the vessel. Next is subtracted the amount necessary to meet the running expenses, such as provisions, bait, oil, ice, shore watchmen, condemned gear and insurance on outfit. The remaining amount is divided equally among the men in the vessel; the owner captain receiving his share as well as the crew. The captain is also entitled to one fifth of the boat's share, but as in most instances the captain is also the owner this division is not generally necessary.

The most recent computation of the proportion of these shares represented by the total catch value shows that approximately one per cent of the gross went to small charges, 19 per cent went to

⁵ *Pacific Fisherman*, 1939 Yearbook, p. 249.

Table 20. United States Operating Units in the Pacific Halibut Fishery, 1937¹

Item	Washington Fleet	Alaska Fleet	Total
Regular halibut vessels:²			
Number.....	131	113	244
Net tonnage.....	3,975	1,369	5,343
Crew.....	1,033	476	1,509
Skates of lines.....	4,052	2,113	6,165
Vessels³ in other fisheries but landing one or more fares of halibut:			
Number.....	13	42	55
Net tonnage.....	267	447	714
Crew.....	73	132	205
Skates of lines.....	289	534	823
Regular halibut boats:			
Number.....	...	33	33
Crew.....	...	81	81
Skates of lines.....	...	381	381
Boats in other fisheries but landing one or more fares of halibut:			
Number.....	...	67	67
Crew.....	...	127	127
Skates of lines.....	...	510	510

¹ Note that this division into "Washington" and "Alaska" fleet is based on the place where the boat landed the major share of their catches. It represents neither the home ports nor the area of origin of the catches.

² Five tons and over.

Source: Figures obtained from the U. S. Dept. of Commerce, Bureau of Fisheries. This table regularly appears in R. H. Fiedler, *Fishery Industries of the United States*, annual, U. S. Dept. of Commerce, Bureau of Fisheries (Washington).

the owner, 27 per cent to running expenses and 53 per cent to the men. As for the amount earned per man in a season, no complete figures are available. A study made of fishermen's earnings in 1934 gave the earnings per man for a halibut vessel in the Northwest and Alaska as \$973.⁶ Since that time the price received for halibut has risen. Estimates of the fisherman's share for 1936 were considerably higher, being given at \$1,350⁷ for Area Two (lying roughly between Willapa Bay, Washington and Glacier Bay, Alaska), including the fishing for sablefish and cod which is carried on after the closing of the halibut fishing. For Area Three (lying between Area Two and Unimak Island, Alaska) it was put at \$1,500.⁸ The fishing is seasonal, and in the off season, usually a period of five to seven months, the men as a rule are unoccupied,

⁶ Arnold, *Earnings of Fishermen and of Fishing Craft*, cited, p. 117.

⁷ Obtained from the industry.

⁸ *Ibid.*

except for general repair work on vessels and gear, although a few may go into other fishing.

Marketing the Halibut

The Pacific halibut is the main source of supply for the halibut consumed in the United States. In the 10-year period from 1927 to 1936, of the 437,000.961 pounds which composed the total United States halibut catch, only 30,615.026 pounds or 7 per cent were caught on the east coast.

Seattle is the focal point of the halibut fishery, as it occupies the leading position in the total of halibut landings. Historically the development of the fishery has been associated with the opening of railroad communications with the eastern part of the continent, which enlarged market possibilities for the fish. Seattle achieved its position of prominence following the building of the connections with the terminals of the Northern Pacific Railway and the Great Northern. Prince Rupert has also figured extensively in American halibut landings following its opening as a terminus of the Grand Trunk Railway and the gradual extension of facilities to American vessels for shipping their fish in bond, purchasing provisions, bait, etc. For some time Prince Rupert surpassed Seattle in American halibut landings, but from 1930 on it has gradually given way. This change, it is thought, was due to the fact that the fishermen prefer to remain in Seattle headquarters during the lay-over period between trips. Also they prefer to take advantage of Seattle's higher fish prices.

For the marketing of halibut there are large wholesale houses in the primary centers which buy the fish from the vessel owners on the exchange and distribute it throughout the country. The proportion of American halibut sold fresh is about 60 per cent. The remainder is frozen and held in refrigerating plants until such time as the supply of fresh fish is exhausted. Marketing is done either through the branch offices of the big western companies or through brokers. In some cases a supply of fish is held by the branch office in the east from which orders are filled in a special territory. In other cases orders are filled directly from Seattle. Again, the order may not be placed either through a branch office or through a broker but through a wholesale dis-

tributor who may buy direct from the home office. Shipments go by rail, with the fresh fish being handled by express or passenger trains. A certain amount of truck distribution is also carried on by wholesalers.

The greater portion of the American fresh- and frozen-fish market is in the eastern United States, about 75 per cent being sold east of the Mississippi River in competition with Atlantic halibut. Very little halibut is sold south of St. Louis, and few carloads of fish are sent south in the winter months. Weather factors in the East affect the western halibut market. An open winter in which the eastern fleet can go out to the Atlantic banks naturally decreases the demand for western fish, while a hard closed winter will increase it. Another factor which of late has affected the marketing of western halibut is increased competition from the eastern fillet trade in perch, rose fish and haddock. The cost of the raw fish and the percentage of waste have made it unprofitable to date for halibut to enter into this packed fillet market.

The price paid to the fisherman is conditioned by the various factors in the food market and by the costs of transportation as well as by supply. Halibut prices since 1930 have reflected the general economic condition of the country. The bottom price of 4.54 cents a pound at Seattle was recorded in 1932. Since that time the average price has risen to 8.76 cents a pound in 1936, 9.09 cents in 1937 and 8.35 cents in 1938.⁹ The total value of landings, however, has also been increased somewhat by the growth in importance of halibut livers and of black cod and cod livers. The value of the halibut-liver catch was \$71,220 in 1932 as compared to \$331,650 in 1936. The total value of the landings of the United States fleet excluding halibut livers, was \$3,089,000 in 1936 and \$3,108,000 in 1937.

In addition to the halibut supplied by United States fishermen, a certain quantity is imported into this country each year, amounting in 1938 to 5,921,634 pounds valued at \$631,172.¹⁰ The bulk of these imports come from Canada and are mainly fresh fish, al-

⁹ *Pacific Fisherman*, 1939 Yearbook, p. 252.

¹⁰ U. S. Dept. of Commerce, Bureau of Foreign and Domestic Commerce, *Monthly Summary of Foreign Commerce of the United States*, Dec. 1938, p. 19.

though a small amount of frozen halibut also comes from Japan. In the 5 years 1931-35 Japanese imports made up only about 3 per cent of the total, while those from Canada composed nearly 96.5 per cent.¹¹ Exports are very small and go almost entirely to Canada.

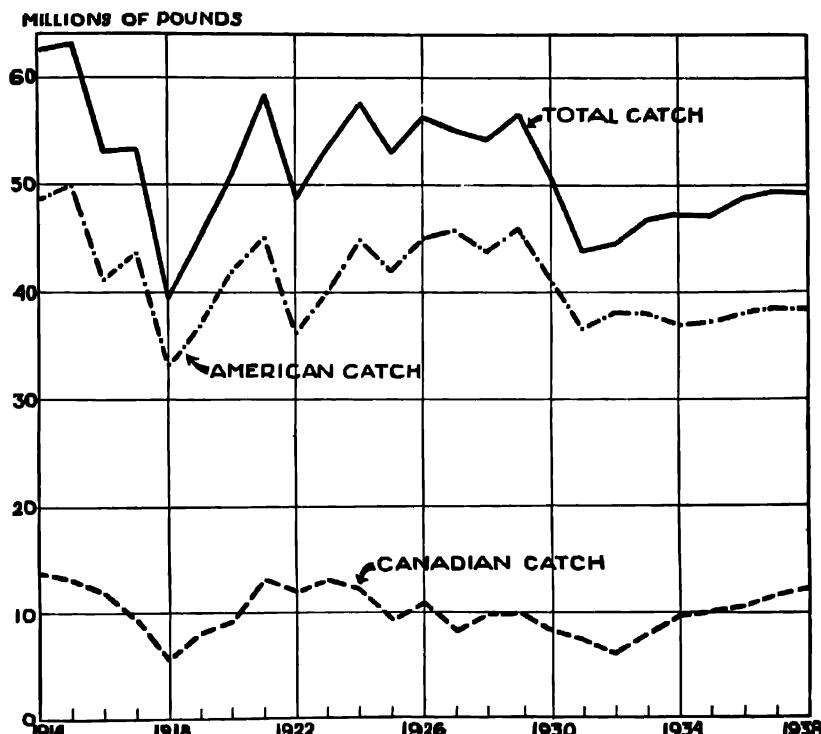


Fig. 18. Pacific Halibut Catch of the United States and Canada, 1914-38.

Source: *Pacific Fisherman*, 1939 Yearbook, p. 247.

The American fleet accounts for the greater part of the halibut catch in the north Pacific (see Fig. 18). The size of the Canadian fleet and catch has been limited to some extent by the size of the Canadian market which is decidedly smaller than that of the United States. In 1914 the Canadians were responsible for less than one quarter of the total catch and the same condition held

¹¹ U. S. Tariff Commission, *Report . . . on Salmon and Other Fish*, cited, p. 72.

10 years later. By 1932 the Canadian share had fallen to less than one seventh, but has since shown a gradual rise. In 1938 it was again approximately one fourth of the whole Pacific catch.

In addition to the domestic market a factor of influence on the Canadian halibut fishery has been the possibility of exports to the United States. The latter country has taken by far the greater part of Canadian halibut exports, although of recent years shipments of frozen halibut to the United Kingdom have acquired considerable proportions. The removal of United States duty on halibut in 1913 provided a stimulus to the growth of the Canadian fleet, but this ceased when the halibut duty was renewed in 1922 at two cents a pound. Canadian halibut has been consistently protected from United States competition by a tariff, one half cent a pound at first, later one cent, and then two cents (in 1931). In their reciprocal trade agreement signed in 1935, however, both countries reduced the tariff on halibut to one cent, and the same rate was continued in the 1938 agreement.¹² The effect of the reduction was immediately apparent in the increased shipments of halibut from Canada to the United States, which rose from 2.5 million pounds in 1935 to 5.1 million in 1937. By far the major part of these exports derive from the Pacific fishery, which predominates in Canadian halibut production. Thus the participation of the United States in the Pacific halibut fishery is even greater as consumer than producer.

CONSERVATION AND RECIPROCITY

For Canada and the United States the halibut fishery naturally presents a common interest. The question of preserving the fishery is of concern to both countries, as well as the related problems of tariff, port privileges, etc.

The joint commission which met in 1918 to consider mutual problems of the two countries concerning their fisheries on both the Atlantic and the Pacific coast gave consideration to the Pacific halibut. A treaty containing both conservation provisions and tariff regulations was recommended but was not adopted.¹³ By

¹² *The New Trade Agreement with Canada*, U. S. Dept. of State, *Press Releases*, vol. 19, no. 477, supplement B, pub. 1253 (Washington, 1938), p. 89.

¹³ U. S. Dept. of State, *Report of American Canadian Fisheries Conference, 1918*, cited.

1920, however, it was becoming generally recognized that the Pacific halibut banks were in a process of dangerous depletion. It was equally apparent that conservation action to be effective could not be unilateral. The persistent efforts of proponents of an international conservation program were at last crowned with success in 1924, when a treaty was signed by Canada and the United States creating an International Fisheries Commission to lay the foundation for effective action.

Historical Depletion of the Fishery

The methods and results of the halibut conservation initiated in 1924 can best be understood through a realistic account of the historical exploitation of the fisheries and of the resultant depletion. Summarized, it can be said to have been a process in which the fisheries near port were worked first and gradually exhausted, following which the fishermen were forced to seek new areas of exploitation. In this expansion they were aided by technical advance which made it possible for them to journey to banks further from home. Increased proficiency in fishing methods enabled the fleet to maintain the total catch while the supply was diminishing in the older areas. As changes in transport came about—the use of steamers, the development of auxiliary motor power for schooners, the adoption of the gasoline engine with sails relegated to the place of an auxiliary, and the introduction of the Diesel engine with its cheaper fuel—deep-sea fishing and trips to distant banks were made possible. Another vital factor in the expansion of fishing was the manufacture and supply of ice, essential to fishing at any distance from port, and the development of cold storage.

A two-fold process came into operation, then, which counteracted the effect of depletion as concerns the total catch, although it greatly accelerated that depletion.

The International Fisheries Commission in commenting on the situation, stated: "Improved methods and greater efficiency have made the fishing continually profitable despite the great fall in returns per unit of gear. With the use of better vessels the grounds have been extended into deeper, more distant, and less protected waters. This ability of the fleet to reach new banks and to tap new sources of supply, plays a greater part in the mainte-

nance of the total yield than does the increased efficiency. . . ."¹⁴ To quote from another report of the Commission, "The total catch has been maintained by an increase in the area exploited. Until 1911 the total of over 50 millions of pounds was taken within 500 or 600 miles north of Seattle, whereas in 1930 approximately the same came from over 2,100 miles of coast."¹⁵ Now, however, all known banks are being fished, and further expansion geographically seems no longer possible.

Statistics of the depletion process have been compiled by the Commission, using as the unit of measurement the weight of fish caught for each setting of a skate of gear, the necessary allowances having been made for changes in the make-up of the gear. These records show that fishing on the oldest banks, those of Puget Sound and British Columbia, fell from 272 pounds per skate set in 1906 to 48 pounds in 1928, an amazing decline of 81 per cent. The grounds off the Oregon coast were also quickly depleted following their large-scale exploitation in 1915. Indeed, the catch fell from 308 to 134 pounds in one year, and soon after became negligible.

Similarly, the depletion of the banks off southeastern Alaska progressed at an even rate from 1914 to 1928, with a total decrease of 70 per cent in the yield per skate. The banks beyond Cape Spencer in central and western Alaska were opened to exploitation following the shift to deep-sea fishing after 1910. The area first fished, that lying between Cape Spencer and Cape St. Elias, had a catch per skate of 320 pounds in 1915. In 1928 that catch was only 66 pounds, a decrease of 79 per cent. In the same period banks further west running from Cape St. Elias to the western end of Kodiak Island showed a decline in catch of 69 per cent; the grounds even further west, those most recently exploited, showed a fall in catch per unit of gear of 50 per cent from 1923 to 1928. "Considering the catch per unit of the fleet as a whole, without regard to bank of origin, it has decreased from 183 pounds in

¹⁴ William F. Thompson and Norman L. Freeman, *History of the Pacific Halibut Fishery*, International Fisheries Commission, Report no. 5 (Vancouver, B. C., 1930), p. 33.

¹⁵ William F. Thompson, Harry A. Dunlop and F. Heward Bell, *Biological Statistics of the Pacific Halibut Fishery (1) Changes in Yield of a Standardized Unit of Gear*, International Fisheries Commission, Report no. 6 (Vancouver, B. C., 1931), p. 12.

1915 to 62 pounds in 1928. This fall has been at an increasingly rapid rate. . . ."¹⁶ These data demonstrated convincingly how acute the need for conservation had become.

Conservation

While all of these facts were not known in 1924, enough was apparent to induce the ratification by Canada and the United States of a convention¹⁷ looking to the conservation of the Pacific halibut.

This treaty provided for a closed season and the establishment of an International Fisheries Commission to investigate the life habits of the fish. It was urged and adopted as a conservation measure, but in the background were economic arguments that were very influential. The move to create a closed winter season had begun following the depletion of closed areas and the opening of certain banks along the eastern side of the Gulf of Alaska in 1913. These were spawning banks which had yielded heavy returns of inferior spawning fish particularly in November and December. Coming from the farther banks the catch was more costly, and bad weather made fishing irregular, difficult and expensive. Moreover, the fresh fish landed at that time competed with the frozen fish stored from the summer landings. Because of the added winter landings the price offered for fish in the summer months was lowered. So strong was the desire for winter closure that in 1921-22 there was a two-month voluntary cessation of halibut fishing on the part of 20 large vessels of the American halibut fleet. On November 16, 1924 began the first winter closure under the provisions of the treaty, extending from November 16 to February 15.

The halibut treaty has been described as the "first effective one anywhere, having for its object the conservation of a threatened high-seas fishery."¹⁸ In its working out it has proved to be a model of international adjustment and orderly regulation on an

¹⁶ *Ibid.*, p. 14.

¹⁷ *Convention between the United States and Great Britain for the Preservation of the Halibut Fisheries of the Northern Pacific Ocean Including Bering Sea*, 43 U. S. Stat. at L., p. 1841.

¹⁸ *Report of the International Fisheries Commission*, Appendix 1 of the *Report of the United States Commissioner of Fisheries for 1930*, U. S. Dept. of Commerce, Bureau of Fisheries, Doc. no. 1073 (Washington, 1930), p. 1.

international scale. Composed of two Americans and two Canadians, the International Fisheries Commission created a Scientific Advisory Board for consultation on a scientific program of work. It also created a Conference Board consisting of representatives of the fishermen's unions and owners' associations interested in the halibut fisheries, both Canadian and American. This Board now meets annually with the Commission to discuss the problems of the industry. The scientific investigations have been carried on under the able direction of Dr. William F. Thompson.

The first report of the Commission (1928) was followed by important modifications in the treaty strengthening the power of the Commission (1930).¹⁹ They provided for an extension of the closed season, and empowered the Commission to change the closing periods when necessary, to divide the convention waters into areas, to limit the catch of halibut in each area, to fix the size and character of the halibut fishing appliances to be used therein, to set up such machinery for collection of statistics from the vessel owners and for licensing and clearing the vessels as might be necessary for the investigations, and to close to all halibut fishing such portion or portions of the fishing grounds as the Commission found to be populated by small immature halibut. A later modification authorized control over halibut caught incidental to other fishing during the closed period, and gave the Commission complete control over the closed season even to the extent of suspension.²⁰ In other words, whereas under the 1924 treaty the Commission was charged merely with investigation of the fishery, the 1930 Convention gave it powers of control whereby to utilize its scientific findings in the interest of conservation.

The basic idea underlying the conservation regulations which the Commission has instituted has been a simple one. Just as the depletion of the fishery was the direct result of too great an intensity of fishing, causing an increase in amount of effort needed to maintain a certain level of catch, so a decrease in fishing inten-

¹⁹ *Preservation of Halibut Fisheries of Northern Pacific Ocean and Bering Sea. Convention between the United States of America and the Dominion of Canada*, 47 U. S. Stat. at L., p. 1872. This Convention, signed in 1930, was not ratified until 1931.

²⁰ *Convention Revising the Convention of May 9, 1930, for the Preservation of Halibut Fishery of Northern Pacific Ocean and Bering Sea*, 50 U. S. Stat. at L., p. 1851.

sity will build up reserves of fish and thereby decrease the effort needed to produce a certain catch. The application of this principle has involved the development of scientific theories and procedures, tested in practice by experiments and by the working of conservation measures.

The Fishery Today

Regulation by the Commission became effective in 1932, when it placed a limit on the amount of fish which could be caught. This was set at 22,500,000 pounds for Area Two and at 23,500,000 for Area Three. The quota of 46,000,000 pounds for the two areas was maintained until 1938, when it was increased 1,000,000 pounds in each area. In addition, an adjustment was made in the division of the poundage to effect a change in the boundary between the two areas. This quota limitation does not extend to landings from the halibut fishery in Area One, which amount sometimes to a million and a half pounds a year.

Since 1929, three years before the regulations went into effect the Pacific halibut catch and its distribution between the two fleets have been as follows:²¹

	American Fleet	Canadian Fleet	Total
1929.....	46,890,984	9,792,900	56,683,884
1930.....	41,989,832	8,481,800	50,471,632
1931.....	36,252,122	7,627,200	43,879,322
1932.....	38,253,025	6,250,900	44,503,925
1933.....	38,461,454	8,300,255	46,761,709
1934.....	37,731,350	9,731,372	47,462,722
1935.....	37,134,980	10,206,054	47,341,034
1936.....	38,291,697	10,584,653	48,876,350
1937.....	37,707,244	11,765,314	49,472,558
1938.....	37,207,257	12,192,912	49,400,169

The permitted total catch was fixed at a level for both areas somewhat lower than the unrestricted catch of 1930 but higher than the catch of 1931. In the latter year no restrictions were in force but economic factors combined to decrease the size of halibut landings. In 1932 the closed season arrived before the permitted amount was caught. The result was that in those two years a greater number of fish than usual were left on the banks to increase in size and ultimately to reach spawning age. This has

²¹ *Pacific Fisherman*, 1939 Yearbook, p. 247; 1938 figures are preliminary.

constituted a capital reserve to which accretions have been made because of the restriction on the yearly catch. The result has been an increase in the poundage caught per skate set as the fish on the banks have acquired greater age and weight with an accompanying diminution of the effort necessary to land a specified amount of fish. In recent years the catch has exceeded the quota set by the Commission, partly because of landings after closure by boats that cleared before the last date of sailing. The excess may also be attributed to the difference between forecast and actual output. In short, it is considered normal and unavoidable.

Conservation regulations have been supplemented by action of the fleets themselves which distribute the permitted fishing in such a way as tends to insure against the market being oversupplied with halibut at any one time. This voluntary control of the production by the industry is under the direction of the Halibut Production Control Board of the American fleet and of the Canadian Halibut Marketing Board for the Canadian. The curtailment program of today evolved by the industry itself places a definite limit on the catch of each vessel for every trip, based on the number of men to a boat, and provides for a lay-off period between each trip. Such restrictions naturally affect the market for fish. The amounts offered in the primary markets are evened out through the season, thus eliminating the depression in price which would occur if the supply were concentrated at the beginning of the season. The plan likewise tends to shorten the storage period which would otherwise be necessary. The division of the catch between the two fleets is unregulated and is determined by general economic factors.

The distribution of the catch between the vessels and the spacing of the landings in the interest of price stabilization are economic measures which do not fall within the jurisdiction of the Commission. As stated in a summary description of the legal powers and function of the Commission: "The Commission has power to regulate for 'the purposes of protecting and conserving the halibut fishery.' This does not authorize any action for economic ends. The Commission can and does try to make its regulations interfere as little as possible with the economic conduct of the industry. But the Commission has no power to deal with

commercial purposes. It can only protect and conserve."²² However, it does cooperate with and encourage voluntary adaptation of the fishery to the economic changes resulting from successful regulation. Most important of these changes are a decrease in costs and improvement in quality. The increased catch per skate set has cut down on the amount of time necessary for catching a specified amount of fish, and hence the length of a fishing trip. Also, the decreased trip length insures the halibut being landed in prime condition, able to command a good price.

Even in its program of conservation the authority of the Commission is limited. It has no power to enforce its regulations and is dependent on the support of the regular law officers of each country. The question of enforcement, moreover, is one which relates not only to the nationals of Canada and the United States for whom the regulations of the Commission have the same force as the laws of their respective countries. It raises the further question of fishing by the nationals of other countries in areas which they contend are extraterritorial waters. What control the Commission or the governments it represents have over such fishing is now under debate. Uncontrolled operations of this sort would inevitably interfere with the conservation work and possibly undo all that has been accomplished in rebuilding the depleted banks.

The potential gravity of the question has caused serious consideration of the extent to which the American and Canadian governments may forbid or restrict alien fishing on the halibut grounds off the coast. They unquestionably have the right to forbid the facilities of their ports to vessels of any other nationality which fish for halibut in the convention waters, to prevent the landing of fish so caught in their territory, and steps have been taken to exercise such right.²³ However, the large refrigerator

²² Allen, cited, p. 1. In 1938 a movement was started to revise the halibut treaty so as to give the effect of law to a program calculated to spread the production of halibut to the economic advantage of the fleet.

²³ The Canadian enabling act of April 19, 1937, states, Section 9 (g), "The Governor in Council may make such orders and regulations as appear necessary to prevent the use of territorial waters or ports or any other Canadian facilities, by any vessel, national or inhabitant of any country not a party to the Convention employed or intended to be employed in the halibut fishery in Convention Waters." *The Northern Pacific Halibut Fishery (Convention) Act, 1937*, Statutes of Canada, 1937, I George VI c. 36. The American enabling act is more detailed. See *An Act for the*

ships such as operate on the Greenland halibut banks have a radius of action which might make it unnecessary to put in at Canadian or American ports. In the winter of 1936-37 the possibility of invasion of the halibut fishery was directly envisaged, when it was reported that a British company planned to send a refrigerator ship into the Pacific banks. (See Chapter XVI.)

The danger of possible interruption to the halibut conservation work cannot be too greatly stressed. At present the Pacific halibut banks are unquestionably being rehabilitated. This is a very delicate process, however; the reserve so far built up is small, capable of being swept away in one year of unregulated fishing. To bring the banks back to anything like their former state of abundance will require years of careful regulation.

The halibut banks in other areas of the world have suffered a type of exploitation similar to that experienced in the Pacific fishery. They are now depleted with nothing being done to bring them back. The conservation of the Pacific halibut is thus important as preserving for mankind the main supply of a natural resource. It is even more than this. If halibut vanished from the food supply of the world no particular inconvenience would be suffered because other fish are available. The main significance of the work of the International Fisheries Commission lies in the fact that it is the first scientific attempt to bring back a depleted deep-sea fishery, as well as the first instance of two nations taking joint action to that end. As such, its work is of enormous import to a world where the exhaustion of fish resources is proceeding at an alarming rate.

Minor Fisheries of the North Pacific

While salmon and halibut represent the most important fisheries in the Pacific Northwest and Alaska, there are other minor fisheries in this large area that are worthy of comment.

The first is the *herring*. This fish is closely related to the pilchard and sardine, and is one of the most prolific producers. The value of Alaska herring output compared with the others that have been considered is not great. It is, moreover, influenced at present by the decline in the demand for cured herring. In 1936 the products of the fishery amounted to \$2,075,632, which represented a reduction of

around 13 per cent from 1935.²⁴ In that year the fishery gave employment to 1,111 fishermen, transport workers and shoresmen, with 27 plants in operation.²⁵ In 1937 there were only 20 plants operating, with a corresponding decrease in personnel employed. Two of these plants did no reduction of the fish and only seven were engaged in curing. The value of the total product, however, was \$2,891,854, an increase of 39 per cent, to be attributed to increased oil production which more than offset the drop in output of cured fish.²⁶

The Alaska herring are protected by a closed season. (Fishing opens in June and continues into December.) There is also a weekly closed period in some districts, restriction and regulation of types and size of gear, as well as closed areas. The main type of gear used is the purse seine, although in western Alaska gill nets are a supplementary form. A certain amount of the catch is used either in fresh, frozen or pickled form for bait in other fisheries. The balance is either cured, or reduced to oil and meal. The fish are graded as they come into the plant and the smaller fish go through the reduction process; the larger are cured, a process involving cleaning the fish, mixing it with salt and packing in barrels. Most of the cured fish is what is known as Scotch-cure which differs from the less common Norwegian-cure mainly in that less salt is used. Herring is also kippered, smoked and pickled, frozen and cured fish being used in these processes. Such secondary operations are not performed in Alaska but usually at smokeries near the point of consumption.

The production of Scotch-cured herring in Alaska fell from 45,740 barrels in 1936 to 8,413 barrels in 1937. For some time the Alaska cured herring has been suffering from the competition of foreign imports; herring can be shipped into the eastern parts of the United States from abroad cheaper than from Alaska.²⁷ It is also reported that American consumption of the cured herring is on the decline because it depends upon the demand from the first generation of European immigrants, now dwindling in numbers. To unfavorable market conditions has been added the rise in labor costs, to which all the fishing industries were subject.

At the same time as the production of cured herring was drastically

²⁴ Bower, *Alaska Fishery and Fur-Seal Industries*, cited, 1935, p. 21; *ibid.*, 1936, p. 300.

²⁵ *Ibid.*, 1936, p. 320.

²⁶ *Ibid.*, 1937, p. 97.

²⁷ The 1937 imports of pickled or salted herring amounted to 34,204,142 pounds. See *Foreign Commerce and Navigation of the United States*, cited, 1937. The duty was $\frac{3}{4}$ cent to 1 cent a pound depending on the size of the container. There were tariff reductions in the 1938 trade agreements with Canada and Great Britain to $\frac{1}{8}$ cent per pound.

diminishing, the output of meal and oil rose to an all-time high with an output of 5,506,738 gallons of oil and 18,550 tons of meal. Herring meal, as other fish meal, goes mainly into poultry feeds. Fish oil can be used for anything for which tallow is used. Large buyers of fish oil on the west coast are houses like Procter and Gamble's, Colgate's, Armour's.

Herring are also landed in British Columbia, Washington and Oregon. In the Canadian province, the fishing ranks as third in importance with a 1937 catch of 192,979,500 pounds; the herring products being valued at \$1,181,500.²⁸ In the American states the fishing is unimportant.

Codfishing in the Bering Sea has been carried on by American vessels over a period of years. In 1937 the catch amounted to 3,790,000 pounds, a decline of about 810,000 pounds from 1936. The fleet of the former year consisted of four vessels. Some purchases of cod were also made from Japanese vessels operating in the area and using trawls as gear. The American fleet operating in offshore waters is not restricted by fishery laws or regulations. Hook and line fishing is the principal method followed, however. Catch of codfish in recent years is noted in the table below:²⁹

Year	Pounds of Fish
1933.....	4,970,000
1934.....	5,088,000
1935.....	4,420,000
1936.....	4,600,000
1937.....	3,791,000
1938.....	3,124,000

Sable fish are landed with halibut in quantities by the American and the Canadian fleets. In 1938 the quantity frozen on the west coast was 4,608,638 pounds. Of this British Columbia accounted for 1,329,009 pounds; Alaska, 773,787 pounds; Puget Sound, 1,329,009 pounds. Columbia River, Oregon and California produced 257,052 pounds.³⁰

Mention must also be made of the Northwest *pilchard* fishery. The pilchard, known in California as the sardine, is caught in British Columbia, Washington and Oregon. Pilchard fishing has long been carried on in the Canadian province but it is a new development for the two American states, where the fish are reduced for meal and oil. Since 1925 this method of processing has also replaced the former canning

²⁸ Canada, *Eighth Annual Report of the Department of Fisheries, 1937-38*, cited, p. 11.

²⁹ *Pacific Fisherman, 1939 Yearbook*, p. 241.

³⁰ *Ibid.*, p. 275.

of the fish in British Columbia. The 1938 pilchard meal and oil production was as follows:³¹

	Meal (in tons)	Oil (in gallons)
British Columbia....	8,706	2,513,990
Washington.....	4,303	1,153,339
Oregon.....	2,933	718,830

A valuable *albacore* fishery has appeared recently in Oregon and Washington. It began commercially in 1937 when approximately 2,000,000 pounds were landed in the ports of these two states, most of which were shipped for canning in California plants. The preparation of canning facilities in the Northwest was begun in 1938 but they were not completed in time for the start of the fishing season. The 1938 albacore catch is estimated at about 10,000,000 pounds. The pack exceeded 100,000 cases, but most of the catch again was sent to California.³²

As regards *shellfish*, moderate amounts of clams, crabs and shrimps are put up in Alaska and in the states. Outstanding are the Washington oyster beds, which had a 1937 output of 7,979,500 pounds valued at \$737,291.³³

³¹ *Ibid.*, pp. 289, 293. British Columbia figures are preliminary.

³² *Ibid.*, p. 183.

³³ U. S. Dept. of Commerce, Bureau of Fisheries, *Statistical Bulletin*, no. 1328.

FISHERIES IN THE ALASKAN ECONOMY

ANY EVALUATION of the salmon fisheries necessarily includes a consideration of their relationship to the economy of Alaska. What is their part in the development of the Territory, past, present and future? How do they compare with other Alaskan industries in providing employment, in furnishing revenue? What would be the effect of a lessened productivity of these fisheries which constitute the outstanding economic component of the Territory?

In order to supply the background for an explanation of the interrelationship between "shore" industries and the fisheries, the economically determinable factors in the industrial setting of Alaska must be described.¹ While much of the information is common knowledge, its pertinence to an analysis of the fisheries justifies its inclusion.

THE ALASKA SETTING

Broadly speaking, there are two outstanding characteristics of the Territory: (a) the vastness of its area, equal to 20 per cent of that of the United States, together with the great distances between its geographical extremities—2,500 miles from north to south and 2,000 miles from east to west; and (b) the marginality of almost all natural resource industries with the exception of the fisheries and a few isolated mining activities, owing to their distance from world markets.

The area of Alaska can be divided naturally into three main regions which vary in topography, altitude, climate and natural resources. The *Pacific Industrial Region* includes the narrow coastal plain extending from the Canadian border in the southeast to the outer extremity of the Alaska Peninsula. Approximately

¹ For a detailed discussion of the Alaskan economy see National Resources Committee, *Regional Planning, Part VII, Alaska—Its Resources and Development* (Washington, 1938).

1,600 miles long, for a great part of the mainland it is flanked by a low-lying coastal mountain range. Under the influence of the Japanese current the coastal region is favored with an abundant rainfall varying from 60 to 120 inches annually, which produces the heavy forests, numerous rivers and hinterland lakes. Many short rivers fed by the spring rains and melting ice provide spawning grounds for the salmon. This region has a fair endowment of mineral resources with economic potentialities; but agricultural activity is limited by a shortage of easily cleared, arable land and by a damp and cool climate. The main commodities now being produced in the Pacific Industrial Region are, in order of their importance, fishery products, furs and minerals.

The *Central Plateau Region* occupies the geographical center of the Territory and has an area of approximately 200,000 to 225,000 square miles. Traversed by the Yukon and Kuskokwim valleys, it is a table land of moderate elevation shut off from the oceans by mountain ranges to the north and south. With less precipitation than the coastal valleys (10-14 inches annually) but with greater range of temperature, the region possesses substantial stands of timber; approximately two thirds of the upland is covered with a tree growth.

The region possesses mineral resources some of which are being exploited. The Yukon and Kuskokwim Rivers are capable of supporting salmon runs, but such runs are not large at present. Nor are these river valleys now important to the fisheries from the standpoint of fish consumption, for a cheap inland meat supply and a small population limit demand. The important salmon producing centers are Bristol Bay and the Alaska Peninsula on the western fringe.

The *Pastoral Region* is the least important in terms of production and of markets. Bordering the Arctic Ocean and the Bering Sea, the northern and western coastal plain extends some 2,000 miles, with an inland reach varying from 50 to 250 miles. Almost at sea level at the margins it is largely marsh broken by patches of waste land. The light precipitation occurs mostly as snow in the winter; temperatures are extreme, and the land nonarable. The flora is that of the tundra—grass, sedge, moss, lichen—and is present in sufficient abundance to support sizable herds of native reindeer. Coal, which together with gold constitutes the mineral

endowment, occurs in large quantities but is locked in the long Arctic winters at great distance from possible markets. The Pastoral Region does not provide a suitable environment for salmon.

Thus only the Pacific Industrial Region and the western fringe of the Central Plateau area are of direct importance to the fisheries of Alaska.

Population

Dependent on the resources of the Territory and active in their exploitation is a resident population of about 60,000 persons.² At the time of the first census in 1880, 13 years after the purchase of "Seward's Folly," there were 33,426 inhabitants. By 1900 the population had almost doubled owing to the gold rush, which continued into the twentieth century. The census figures reached their peak in 1910—64,356—but declined in the next decade of industrial readjustment. By 1930, however, they had again increased to 59,278, as shown in Table 21. Among the outlying territories and possessions of the United States, then, Alaska is one of the smallest in population, despite its huge area. Hawaii, for example, with an area little more than one per cent that of Alaska has a population six times as great.

Table 21. Population of Alaska, 1880-1930

Year	Population	Increase or Decrease	
		Number	Per Cent
1880.....	33,426	..	..
1890.....	32,052	- 1,374	- 4.1
1900.....	63,592	31,540	98.4
1910.....	64,356	764	1.2
1920.....	55,036	- 9,320	- 14.5
1930.....	59,278	4,242	7.7

Source: U. S. Dept. of Commerce, Bureau of the Census, *Fifteenth Census of the United States: 1930: Outlying Territories and Possessions* (Washington, 1932), p. 7.

The population of Alaska is scattered unevenly through its various districts. Large areas in the north are virtually uninhabited, while about a third of the people are concentrated in the southeastern region. This latter region again is the only one to show consistent growth from 1910 to 1930, a period when the popula-

² All population statistics in this section are from U. S. Dept. of Commerce, Bureau of the Census, *Fifteenth Census of the United States: 1930: Outlying Territories and Possessions* (Washington, 1932).

tion of the rest of the Territory was dwindling. It is the Southeast where the largest fishery operations take place, and where the principal expansion has occurred during the past twenty years. This region is also the one farthest advanced from frontier conditions and with the most rounded economy in general.

As to the racial composition of the population about 50 per cent were Indian in 1930 and 48 per cent white, with the balance Oriental and Negro. This shows a shift since 1910 when the whites were in the preponderance with 56 per cent of the total and the indigenous population represented only 39 per cent. In 1930 the section of Alaska with the greatest number of Indian residents was the second judicial division, bordering on the Bering Strait and Arctic Ocean, where they constituted 86 per cent of the total population. The fourth judicial division, comprising the hinterland of the Yukon and the Kuskokwim valleys, also had quite a high proportion, 59 per cent, which represented a marked population shift since 1920 when only 44 per cent of the residents were Indian.

Occupation of Alaska Residents

In 1930 the number of persons gainfully employed was 27,752, of which only 2,854 were females. (The ratio of the sexes in the

Table 22. Occupational Distribution of Gainful Employment in Alaska, 1930

Occupation	Total	Male	Female
Domestic and personal service.....	6,099	5,258	841
Extraction of minerals.....	4,787	4,739	48
FISHING.....	4,775	4,669	106
Manufacturing and mechanical industries ¹	3,034	2,344	690
Transportation ²	3,006	2,891	115
Trade.....	1,746	1,472	274
Professional service.....	1,406	745	661
Agriculture ³	1,198	1,170	28
Forestry.....	412	405	7
Public service.....	915	859	56
Unclassified.....	374	346	28
	27,752	24,898	2,854

¹The chief occupations are food and allied industries, mainly fish canning, 1,032; iron and steel industries, 289; lumber and woodworking industries, 249; hand trades, 318.

²Of this total, 1,260 are occupied on the steam railroads.

³General farming, etc., 397; fur farms, 420; reindeer farms, 381.

Source: U. S. Dept. of Commerce, Bureau of the Census, *Fifteenth Census of the United States: 1930: Oullying Territories and Possessions* (Washington, 1932), p. 7.

total population is 1 1/2: 1.)³ Table 22 shows industrial occupations by order of their importance as a source of employment.

Fishing stands third in this classification, affording employment to 17 per cent of the total employed. As was to be expected from what has been said before, the greatest concentration of persons employed in fishing in 1930 came in the southeastern district. This region had 2,916 fishery workers—i.e., 61 per cent of the total number engaged in fishing throughout the Territory and 30 per cent of the total gainfully employed in that division. Central and western Alaska followed with 1,913 engaged in fishing, or 23 per cent of the total employed in that section. An additional amount of employment directly dependent on the fisheries is included in the categories of transportation and manufacturing and mechanical industries. For example, 1,032 persons were occupied in food and allied industries, of which fish canneries and other processing plants constitute a large sector.

The importance of fishing to the Indians is not fully indicated by these census statistics. They report Indians gainfully occupied at 8,770 in 1930 or 31 per cent of the total occupied. The largest group—4,413—were found in domestic and general personal service. In other words about half the Indians reported gainfully employed were in personal service, and they accounted for almost three quarters of the total number in that category. Another 2,000 or so were reported engaged in fishing.⁴ Since half the total population is Indian and fewer than 9,000 were recorded as gainfully employed it is obvious that large numbers were otherwise finding a living—presumably in primitive pursuits among which non-commercial fishing is important.

As contrasted with these figures for fishing employment among Alaska residents alone it is interesting to note that the Bureau of Fisheries reported a total of 10,189 persons engaged in Alaska fishing and 16,645 in processing and wholesaling plants in 1929, the year in which the 1930 census was taken.⁵ The fisheries obvi-

³ *Ibid.*, p. 22.

⁴ In the statistics on Indian employment fishing and forestry are grouped together. This figure was computed on the ratio of fishing and forestry employment for all races.

⁵ Bower, *Alaska Fishery and Fur-Seal Industries*, cited, 1929, p. 96.

ously drew more on imported labor than on that resident in the Territory.

FISHERIES IN RELATION TO INDUSTRY AND AGRICULTURE

As in the case of many pioneer countries, exploitation of mineral wealth served as the chief means of opening the Alaska territory to settlement. Mineral output outranked that of the fisheries in value for a considerable time, although Alaska was producing

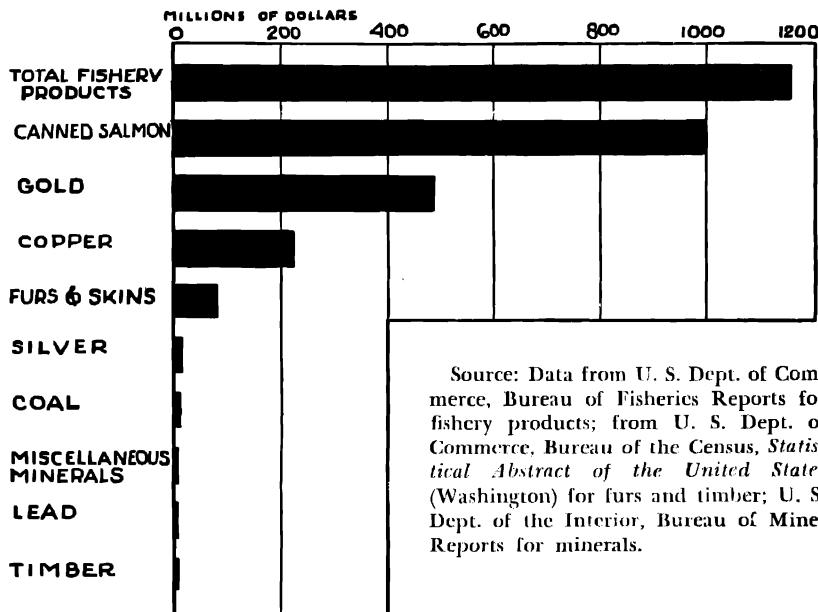


Fig. 19. Total Production of Major Commodities in Alaska, 1880-1937.

salmon and halibut before the discovery of gold. During recent years, however, fishery products have taken the leading position and bid fair to hold it for some time, since government regulation has placed the fisheries on the basis of permanent yield.

Mining and the Fisheries

Minerals and fish have predominated in the Alaskan economy. (See Fig. 19.) The total output of fishery products from 1880 to 1937 reached a value of \$1,160,844,722 and minerals \$748,895,056.

In 1936 Alaska ranked twenty-ninth in importance among the states and territories of the United States in mineral production. The contribution made by the various minerals to the total output from 1880 to 1937 was as follows:⁶

Gold	\$489,487,079
Copper	224,431,789
Silver	13,196,937
Coal	11,002,597
Tin	1,457,607
Lead	2,357,226
Other minerals	6,961,821
 Total	 \$748,895,056

Thus gold was the leading mineral in Alaska during this period, with copper in second place having a total output equal to about half that of gold. In pre-war years output of the yellow metal far outranked its nearest rival; from 1880 to 1915 it amounted to \$260,300,000; up to the latter date copper totalled only \$35,000,000. Since then the production of copper has exceeded gold in approximately one half of the years. The total value of gold production since 1915 has outrun that of copper only by \$24,182,272, and this despite the fact that during the recent depression the copper output dropped to the vanishing point, being only \$1,900 in 1933. With the increase in price due to world demand copper production rose rapidly during 1935, 1936 and 1937, but reserves are nearing exhaustion in some of the mines now operating.⁷ Gold production has also responded in recent years to the world-wide rise in price.

In coal production from 1880 to 1937 Alaska has only succeeded in satisfying about 37 per cent of its consumption, despite its very large deposits. Up to the time of the World War output totalled only 71,000 tons whereas imports from the United States amounted to 679,844 tons and from British Columbia 1,079,735. Since that time the output of Alaska mines has increased absolutely and relatively compared to the total consumption. Total production fell just under two million tons in 1937.

There is little interrelation between mining and the fisheries.

⁶ U. S. Dept. of the Interior, Geological Survey, *Mineral Industry of Alaska in 1937, Preliminary Bulletin* (Washington, 1938).

⁷ Latest reports indicate that the Kennicott mine is exhausted and has been closed down.

A limited tonnage of coal is consumed in the canneries of western Alaska;⁸ and the mines, especially those along the coast, furnish a limited market for fishery products. But this exchange of products is not large. Mining and fishing exist largely as independent entities except for some dependence of mining upon fishing and salmon canning in the matter of transportation of supplies. This will be discussed somewhat more fully later.

As regards labor, too, virtually no dovetailing exists.⁹ Labor backgrounds and techniques in the two industries are so distinct that only on rare occasions do workers go from one industry to the other. Increased mining activity following the rise in metal prices since 1933 has not drawn labor from the fishing and canning industry. While a good proportion of the Alaska fishing labor is Indian the population engaged in mining is practically all white. Part of it is found in the southeast section where there is much canning activity as well, but there is also a great deal of mining in the interior and northern regions far from the fishing centers.

The mutual independence is still more pronounced in the proprietary levels in mining and fishing. The entrepreneur miner is congenitally unrelated to the fisherman. The independent Alaska fisherman takes to the minor fisheries such as crab, clam and the like during the off-season in the salmon and halibut fisheries.¹⁰

Forestry and the Fisheries

In the absence of new discoveries of important mineral deposits the utilization of the timber resources of Alaska may furnish the main stimulus to future industrial growth.¹¹ Such possibilities are centered chiefly in the Pacific Industrial Region. The inland forests will be consumed locally by the mining and agricultural industries except for the better located stands of birch which may be marketable as furniture stock for the factories of the Pacific states. It is the coastal forests, however, which contain the principal timber resources of spruce and hemlock. With an accessible

⁸ Interview with packer.

⁹ Interview with Alaskan operators.

¹⁰ *Ibid.*

¹¹ Compare U. S. Dept. of the Interior, *General Information Regarding the Territory of Alaska* (edition of Nov. 1929, Washington, 1930), p. 37; also National Resources Committee, cited, p. 104.

coast having numerous ice-free harbors and good industrial sites, cheap water power, and ocean transportation to world markets,¹² they provide a base for a sizable pulp and paper industry.¹³

At the present time the logging and lumber industry is small but of some importance in the Alaskan economy. It is mainly confined to southeastern Alaska where the total investment in 1936 approximated \$3,000,000.¹⁴ According to the census statistics of 1930 the number of individuals employed in forestry was 412, in addition to which 226 persons were engaged in saw and planing mills. The total output of the timber industry through 1937 has been very small in value, as can be seen from Fig. 19. The products are partly exported and partly consumed in the Territory.

To a certain extent these logging and lumbering industries are dependent upon the fisheries. A limited quantity of Sitka spruce is made into salmon packing boxes. Here it competes with paper containers as indicated by the large annual shipments of fiber containers from Seattle to Alaska. The salmon industry also opens a demand for trap piling and other lumber. Only part of this demand is filled from the local forests, however, as quantities of piling for traps and sawed timber for salmon cannery construction purposes are shipped north on the salmon boats from Puget Sound each year.¹⁵ Nonetheless, the rate of activity of the Alaska logging industry coincides with fish trap operations, fluctuating directly with the number of traps installed. It has been estimated that 65 per cent of the man hours in southeastern Alaska logging and lumber industries is utilized in producing timber products for the salmon canning industry.¹⁶ Operations cannot be con-

¹² U. S. Dept. of Agriculture, *Regional Development of the Pulpwood Resources of the Tongass National Forest, Alaska*, Bulletin no. 950 (Washington, 1921), pp. 2-16.

¹³ U. S. Dept. of Agriculture, *How the United States Can Meet Its Present and Future Pulpwood Requirements*, Bulletin no. 1241 (Washington, 1924), pp. 53-54. It is authoritatively stated that under careful management on a permanent yield basis, the national forests of Alaska can produce two million cords of pulpwood annually, or roughly one third of the pulp products consumed in the United States, which in 1936 imported the bulk of its newsprint from abroad.

¹⁴ *Fish Traps in Alaskan Waters, Hearings . . .*, cited, p. 214.

¹⁵ *The Port of Seattle Yearbook, 1937*, shows 5.79 million feet of lumber shipped to Alaska for the year 1936.

¹⁶ *Fish Traps in Alaskan Waters*, cited, pp. 209-14. Much of the marketable timber, all of which must be removed under government regulation, is fit only for fish traps.

ducted for the local lumber markets exclusively; the manufacture of trap piling is necessary in order to make logging successful.

There is also an interrelation between the two industries as regards labor supply. During the recent depression approximately 600 men worked part time in the lumber industry in southeastern Alaska.¹⁷ The balance of the year was devoted to fishing and cannery work, and in the winter some trapping was done. Dovetailing of labor is a possibility. While the lumber industries have not been potent factors in the development of the fishery industries to date from a labor standpoint, there is little doubt that if the timber resources are utilized in making products such as pulp and paper, in the future a common pool of interchangeable workers may become available to all industries located in these coastal centers. Undoubtedly this will be of great advantage to the salmon industry in the future in stabilizing its operations and will assist in the provision of a satisfactory livelihood for resident workers.¹⁸

Agriculture and the Fisheries

Alaskan agriculture has been referred to as an industry possibly complementary to the fisheries, one which if developed would furnish potential interchange of labor and of produce to the benefit both of the community and of the industries concerned. In the determination of this possibility a highly important factor is the competition of the agricultural economy of the Pacific coast states with Alaskan agriculture.

The portion of Alaska suitable for agricultural development has been officially estimated at approximately 100,000 square miles. The principal arable regions are in the valley of the Tanana River in the interior and the Matanuska valley which extends toward the interior from Cook Inlet on the Pacific. Areas of less importance are the west side of the Kenai Peninsula, the Healy Plateau and the Kuskokwim and Yukon valleys. There are also small areas along the southern coast suitable for general farming.¹⁹ The 1930 census showed 500 farms comprising 8,825 acres improved land, 104,245 acres woodland, and 412,872 acres unimproved, or only 0.1 per cent of the total Alaskan area. The value

¹⁷ *Ibid.*, p. 214.

¹⁸ No recent census data are available that show the importance and growth of manufactures in Alaska.

¹⁹ National Resources Committee, cited, p. 112 *et seq.*

of land and buildings was given as \$2,857,185, 66 per cent of which was held by owners.

Agriculture was early introduced and fostered in Alaska by the United States government as a complement to the mining industry. The richness of the Alaska soil and the extraordinary crop yields are common knowledge, yet the growth of farming up to recent years has lagged behind the general development. One of the heaviest imports of Alaska is foodstuffs, which Territorial agriculture would seem pre-eminently fitted to supply. Twenty-seven per cent of all imports into the country in 1936 were agricultural products, used in large part by the salmon canning industry. To resolve this paradox of scarcity in a land of such great natural resources will explain away many of the reasons for the apparent backwardness of industrial development in general.

Transportation factors play a considerable role in this matter. As noted previously, the coastal and inland river regions of Alaska are supplied with transportation routes. But the small volume of traffic and high freight and truck rates within the interior and also from the interior to the seaboard bring the tide-water price of most agricultural commodities raised in the Yukon and Tanana valleys above the competitive price of products grown in the western states. This is true not only of crops but of poultry products, of which Alaska imports half a million dollars' worth each year. The large-scale, efficient methods used on Washington, Oregon and California farms give producers in these states an advantageous position in cost of production compared to the producers in the northland.

So it is, too, with meat products. With a cheap grazing area in the northern tundra coupled with cheap native labor for herding reindeer and processing reindeer products local markets could be adequately supplied with this type of meat. The quantity is indeed sufficient for merely local requirements,²⁰ and with improved transportation the industry may be in a position to expand. In 1937, however, meat imports were valued at \$1,366,493. Reindeer meat is not used broadly in the Territory at present. The industry hardly competes with fisheries as a source either of food or of employment. Nonetheless, reindeer raising is self-support-

²⁰ *General Information Regarding the Territory of Alaska*, cited, p. 34.

ing²¹ and is an industry capable of extension; authorities report that it is in a position to carry the entire Eskimo population. To the extent that it constitutes a possible source of cheap protein food for the Alaska market it may be said to offer at least potential competition to fishery products.

Grouped with agriculture in the Census statistics is fur production. Except as fox farms provide a means for utilizing the waste material from salmon canneries, however, this phase of Alaskan economy has little pertinence to a consideration of the fisheries. Trapping, it is true, provides a source of income to many of the resident workers in the fisheries.

The largest single occupational group in Alaskan industry are fishery workers. In competition for the good market they offer, the agricultural regions of Alaska are at a disadvantage with the coastal valleys of Puget Sound, eastern Washington, and likewise the early fruit and vegetable belts of southern California. All of these regions in the states have an advanced agricultural economy, with longer growing seasons, freedom from the expensive inactive winters, a more abundant labor supply, and a better division of labor as regards crop specialization, selection of workers, mechanization and marketing. With the relative advantages of earlier seasons, larger markets, better utilization of land and better handling of farm by-products, lower costs are to be expected in the states. Agriculture in Alaska, moreover, bears a high opportunity cost from industry and mining, where wage levels, especially in the latter, are relatively high. In the canning and food preserving industries of the coastal states many women are employed, whereas the relative scarcity of female workers in Alaska limits this cheaper type of labor.

Again, Alaskan agriculture is handicapped by the lack of synchronization between the vegetable and meat production season and that for salmon canning. This limits the local demand for the crops for which the Territory is especially adapted. Harvesting of farm produce occurs after the major portion of the fish canning has taken place, since many of the salmon runs are packed and shipped to markets by July or early August. Early California crops are harvested soon enough to ship north with the outfitting of boats that sail in May and June. Eastern and western Washing-

²¹ *Ibid.*, p. 33.

ton also ship fresh vegetables and fruit before the final closing of the fish canning season. This militates against such developments as the Matanuska colony finding markets in the salmon canneries, even though subsidy provides artificial stimulus to agriculture. Many of the salmon canneries and salteries are located in isolated coastal places having irregular water transportation service which works against low water rates or frequent shipments.

Regarding Alaskan agriculture in general a government report summarizes the matter by stating that "in many parts of Alaska, strictly pioneer conditions still obtain and home markets are at present restricted to a small population, as compared with many sections of the states . . . agricultural development will be gradual, growing with the construction of highways and railways, with the development of mining industries, and accompanying increase of population."²² The same authority maintains that "the economic conditions prevailing in Alaska have prevented speedy settlement of the Territory by farmers. The only markets available have been local ones, and transportation has been too expensive to seek outside or distant markets."²³

These facts indicate that there is little likelihood of unsubsidized Alaskan agriculture improving its economic relationship with the fisheries industries substantially in the near future. Growth of farm population may provide a larger supply of resident labor and demand for fishery products, but geographical and climatic factors stand in the way of any large interchange of goods.

What position, then, do the fisheries occupy in relation to the aspects of Alaskan economy so far considered? They lead other natural resource industries in value of output, and they provide employment to a sizable section of the population of the regions where commercial fishing is carried on. Among other industries logging and lumbering is the only one that has any appreciable direct dependence on the fisheries, with an interchange of labor personnel and with the fisheries furnishing a demand for lumber products. Mining has little direct interdependence, and so it is with agriculture.

²² *Ibid.*, p. 27.

²³ *Ibid.*, p. 28.

There are, nonetheless, other factors of dependence not as direct as these so far considered which are not to be overlooked. The whole economy of the Territory is dependent upon the fiscal system of its government. No less evident is its dependence upon the transport lines which link Alaska to the states. Fisheries are the mainstay of both, and must accordingly be considered in this aspect. The next chapter will examine this relationship in greater detail.

FISHERIES IN THE ALASKAN ECONOMY

(continued)

THE ALASKA FISCAL SYSTEM AND THE FISHERIES

THE DOMINANT position of fisheries in the Alaskan economy is most clearly evident in relation to the Alaska fiscal system. This system, in fact, is built upon the taxation of fisheries. The backwardness of the general industrial and agricultural development of Alaska, together with the policy of governmental ownership of practically all land and natural resources which keeps much real estate from the tax rolls, has resulted in the nonassessment of a general property tax except in the towns. Moreover, such property taxes would be costly to collect because of the great distances from administrative centers and the absence of cheap transportation. The Territorial government has therefore been compelled to levy various excises and collect license taxes on those concerns which are found in the towns and the scattered fishing areas. The fisheries are its chief sources of revenue.

Because of the relatively large volume of business and the high concentration of goods passing through canneries and cold storage plants on the sea coast, fishing gear taxes, occupation taxes, and per capita taxes are easily assessed and economically collected. The perishability of fish requires that they be processed near the spot where they are caught, a circumstance that prevents the shipment of much raw fish from the Territory. Moreover, the relatively high sales value of the chief finished products, salmon and halibut, makes possible the absorption of a greater tax levy by the industry than if these products occupied a lower place in the scale of consumption such as is held by herring, pilchard and scrap fish.

Income from the fisheries dominates the Territorial revenues controlled by the local legislature as distinct from those of the Federal government. Sources of revenue include inheritance, in-

surance premium, automobile and poll taxes; fees from corporations; income from national forests and liquor sales; license fees on resident and nonresident fishermen, salmon canneries and fish traps; and other minor sources. Practically all these funds are deposited in the banks of Alaska.

From 1923 to 1935 fishery industries taxes and licenses on resident and nonresident fishermen accounted for an average of 78.5 per cent of the entire Territorial tax revenue. During this period, moreover, the percentage of total Territorial revenues paid by the fishery industries showed a steady increase. In 1923 it was 66.2 per cent of the total; but by 1932 it had reached 85.6 per cent. The 1935 and 1936 data of the Treasury Report are incomplete.

In summary form the tax revenues as compiled from the biennial reports of the Alaska Treasurer are shown in Table 23.

Table 23. Revenues of the Territorial Government of Alaska

Year	Fishery Taxes	Fishermen's Licenses	Total Fishery Revenues	Other Than Fishery Revenues	Total Revenues	Fishery Per Cent to Total
1923.....	\$696,592	\$13,855	\$710,447	\$363,057	\$1,073,505	66.2
1925.....	496,167	46,514	542,681	216,110	758,792	71.5
1927.....	450,321	45,622	495,943	169,407	665,351	74.5
1929.....	680,651	46,013	726,664	170,983	897,648	81.0
1931.....	656,501	36,108	692,609	125,776	818,384	84.6
1933.....	763,948	61,840	825,788	178,903	1,004,690	82.2
1935.....	528,517	51,718	580,235	442,277	1,022,512	56.8 ¹
1936.....	97,135	98,888	196,023	280,832	1	1

¹ Incomplete returns.

Source: Compiled on an accrual basis from the biennial *Report of the Treasurer of the Territory of Alaska, 1926-36* (Juneau, Alaska). Items of a nonrecurring nature have been omitted. Fishery revenues consist of salmon canning pack taxes, fish trap licenses and additional trap taxes, taxes on gill nets and purse seines, salmon canning income taxes, taxes on salteries, on clam canneries, on cold storage plants, fish oil and fertilizer plants, and taxes on fish buyers.

These figures do not include a poll tax of \$5.00 levied on all resident and nonresident fishermen and fishery industries employees.

Apart from the Territorial budget there are annual expenditures in Alaska by the various departments of the Federal government amounting to several millions of dollars. In addition there is an "Alaska Fund" into which the Federal government deposits the moneys from business and trade licenses outside of incorporated towns. Expenditure of this "Alaska Fund" by Congressional appropriation is divided among Territorial roads, schools and relief. The Federal government also collects a pack tax of four cents on each case of canned salmon, which is paid into the

Federal treasury and appropriated for use in Alaska. During the last 10 years, this tax has averaged approximately \$240,000 a year.

To what extent the development of the other natural resources of Alaska has been assisted by the taxation of fisheries cannot be stated in final terms. However, it should be readily granted that any diminution in public income from this source would have a serious effect upon the entire fiscal system of the Territory and would place a heavy burden on all industries, especially on the struggling agricultural economy which is being fostered as a matter of public policy.

THE FISHERIES AND ALASKA COMMERCE

The external trade and trends in commercial activities of Alaska are worthy of some consideration at this point, since the economy of the Territory is extremely dependent on its foreign trade, and this trade in turn is dominated by the fisheries.

The present trade structures in Alaska coastal transport are built around the movements of two major lines of traffic—namely, (a) southbound fishery products, minerals and fur skin products and (b) northbound cannery operating and fishing supplies and commodities used in the mining industries.¹ The bulking items in the make-up of cargoes are fish products and supplies and equipment for the fishing interests. These have constituted over 80 per cent of all shipments from Alaska to the United States since 1925. In some years they have reached 93 per cent of the total. This indicates the striking importance of the fisheries industry in the external trade of Alaska.

One aspect of this importance relates to transportation costs. The marginality of many of the basic resources and industries of the Territory is due largely to the high costs of ocean transportation to world markets.² Existing Alaska transport services moreover, as we have seen, rely largely on the fishery industry for their maintenance. It requires little imagination, therefore, to foresee that the destruction of the north Pacific fishery reserves from any cause, foreign exploitation or overintensified fishing by domestic commercial interests, would inevitably bring about a serious

¹ The Custom Service of Juneau indicates 1,431 coastwise vessels and 898 in foreign trade cleared Alaska in 1937.

² Compare U. S. Maritime Commission, *Economic Survey of Coastwise and Inter-coastal Shipping* (Washington, 1939), p. 9.

decline in coastal shipping service with a resulting increase in shipping costs. This would adversely affect the entire Territory and especially the auxiliary industries dependent upon fishing.

The total external trade of Alaska for the year 1937 amounted to \$123.6 millions of which the exports to the United States, including gold shipments, were \$80.1 millions and to foreign countries only \$400,117. Imports into Alaska from the United States amounted to \$42.9 millions and from foreign countries \$223,221. Trade between the Orient and Alaska is practically nil, and shipments to all countries outside the United States in the aggregate were only one half of one per cent of the total exports in 1937.³ Thus the direct trade of Alaska is almost exclusively with other ports of the United States, with which it has free trade relationships.

Balance of Payments of Alaska

Before analyzing the composition of Alaskan imports and exports attention should be drawn to the striking export surplus which has characterized the last quarter of a century. As revealed in Fig. 20, which does not include gold shipments, the trade balance reversed itself just before the World War, and since then exports have exceeded imports by a wide margin sometimes amounting to more than 100 per cent. The balance becomes even greater if gold shipments are included. In 1937, for example, they amounted to \$17.7 million as compared with \$62.4 million of merchandise shipped to the United States. The flow of gold from Alaska reached a peak in 1910 and continued moderately high until 1918, when it declined sharply until 1924. From that year to 1933 it showed a 100 per cent increase. The rise in the world price of gold has raised the value of subsequent gold shipments to the level of the boom years. In 1938, in fact, an all-time high was established.

This favorable trade balance in turn invites attention to the balance of payments. Such balances are usually calculated only for national states, it is true, but the calculation is equally appropriate and useful for any regional subdivision. The balance of payments is simply an itemization of transactions which call for

³ U. S. Dept. of Commerce, Bureau of the Census, *Statistical Abstract of the United States* (annual), 1938 (Washington, 1939), p. 563.

payments to and from a region—whether those transactions are “visibles” like merchandise trade, or “invisibles” like shipping services, tourist remittances, and payments of interest and dividends. Taken all together, debits must equal credits, as in any

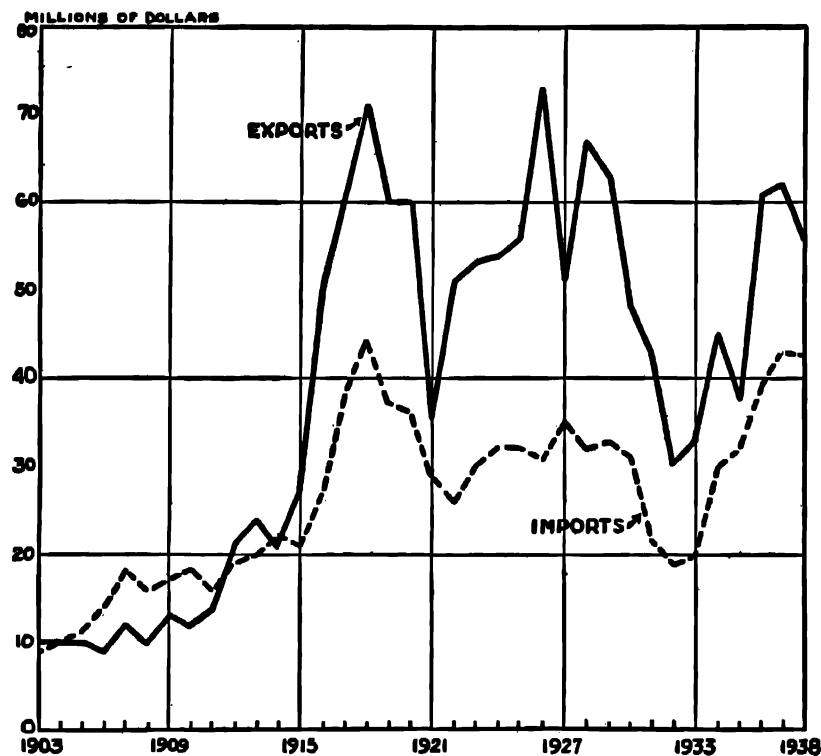


Fig. 20. Trade of Alaska with the United States, 1903-38.

Source: U. S. Dept. of Commerce, Bureau of the Census, *Statistical Abstract of the United States*, 1938 (Washington, 1939), p. 563, for all years to 1937; U. S. Dept. of Commerce, Bureau of Foreign and Domestic Commerce, *Monthly Summary of Foreign Commerce*, Dec. 1938, for 1938 figures.

double-entry bookkeeping. Balances of payments are usually constructed only for national entities merely because more data are available on international than on other interregional transactions, and because special interest attaches to the economic relations of a country with the outside world. A similar approach to the economic status of a domestic region like Alaska, however, is

useful in throwing light on the essential character of its economic organization.

In the case of Alaska, an analysis of its balance of trade and payments brings out certain striking features of its economy, and especially of the fisheries industry which plays such a large role. Statistical data are lacking to construct an accurate balance of payments, but the principal characteristics are apparent.

One such characteristic is the export surplus referred to above, which is measurable because trade statistics are readily available. This favorable balance of trade in turn raises the question as to how total payments are balanced from year to year—what invisible items compensate for this large credit item and preserve equilibrium in the financial relations of Alaska and the rest of the United States? The uninitiated might reason that gold would have to be transferred to Alaska to pay for its export surplus, but the fact is, of course, that Alaska is a gold producer and exporter with a regular outward movement of this metal. Then how is this continuing favorable trade balance made possible?

Since the external trade of Alaska is so dominated by the fisheries industry, especially as regards exports, the answer is to be sought primarily in the operations of the fisheries. These, together with the other export industries of Alaska, chiefly mining, supply the exports of the Territory shipped south to be cleared through the American marketing and exchange system. Export sales represent a large part of the gross revenues of these industries. How and where is payment made, and what disposition is made of the proceeds in the form of expenses of production and profits? The answer to this question will not only throw light on the financial operations of these industries but also on the balance of payments of the Territory in whose economic life these export industries are preponderant.

First of all, it is clear that a part of the proceeds of exports goes into paying for imports of supplies and equipment into Alaska. If exports are largely the products of Alaska's fisheries and mines, so imports are chiefly the materials required for equipping and operating these enterprises from year to year. Much of the capital equipment of Alaska canneries, transport, mines, lumber mills, farms, stores, etc., has been shipped in over the past 30 years. In addition, the annual cost of operating the economic system, domi-

nated as it is by the fisheries, includes extensive purchases of current supplies in the states. These imports, then, go part way to balance exports.

It is the export surplus, however, whose financing requires further consideration. Its explanation is to be sought primarily in the fact that the current operations of many Alaskan industries are financed largely in the states; hence a large share of the export proceeds is never remitted to Alaska but is retained in the states. A good part of Alaska's wage bill, for example, is paid in the organizing and supply centers to the south; the same thing is true of shipping services, maintenance costs, and like items. Theoretically these costs might be considered as inpayments in the Alaska balance of payments. Or, more realistically, not only the above-mentioned outlays in the states but also the corresponding portion of Alaska's export surplus ought to be excluded from the balance of payments in analyzing actual transfers of funds into or out of Alaska. Either approach to the question will indicate the true character of Alaska's inpayments in relation to outpayments. Either will illustrate the dependent status of the Territory, the role of fisheries in this connection, and the distribution of the proceeds of Alaskan exports.

To make the matter more concrete the principal invisibles which match the export surplus of Alaska are described more fully in the following paragraphs. There are other items of a minor nature which would have to be included in any complete tabulation, of course, but the categories detailed below are those most important for present purposes.

1. *Wages.* This includes wages paid to workers in Alaska fisheries which are not spent in Alaska. Individual purchases made in the states by Alaska fishermen, cannery workers and other employees both before and after the working season in Alaska indirectly come out of the export proceeds, which recoup the operator for his outlays on wages and raw materials. Fishermen's savings out of wages may also be spent on capital goods such as fishing boats and gear,⁴ which, although used in Alaska waters, are not recorded in the import statistics. A larger share of these expenditures cannot be made in Alaska because of the isolation of most

⁴ Little capital has gone into halibut boats in recent years, but considerable sums have been invested in new salmon purse-seine and trolling boats.

of the individual canneries and fishing grounds from trading centers. Purchases of imported supplies by workers at company commissaries and in the towns would be connected with merchandise imports, an outpayment item in the balance of payments. Complete wage data are not available but it is known that total payments to cannery workers and fishermen in the Alaska salmon fisheries from 1910 to 1935 exceeded \$250 millions.⁵

2. *Transportation Costs.* Transportation charges are largely invisible outpayment items which do not enter into the recorded values of Alaska trade in any significant amount. They take the form of expenditures for wages, supplies and equipment, chiefly in the states. Their total is not inconsiderable, as indicated by the size of the payments to workers employed by the various carrier concerns and the costs of maintaining and replacing vessels, administrative plants, marine ways, docks, wharves, etc. In addition to the steamship traffic charges on all cargoes, import and export, account must be taken also of the cost of outfitting and operating the cannery fleets owned by the larger packing concerns, and also the smaller miscellaneous fishing vessels that serve as coastal carriers when not engaged in fishing and related operations. The chief centers where Alaska transportation is financed and controlled are the cities of Seattle, Tacoma and Bellingham, with San Francisco occupying an important though secondary place.

3. *Replacement and Maintenance of Local Transport and Fishing Equipment in Northern Waters.* The list of supplies required for maintaining and replacing the fishing fleets covers the entire category of ship chandlery, outfitting, engines, machinery, fishing gear, and the general costs found in the operation of the modern fishing craft. As these goods and services are applied directly on the boats and do not clear through the United States customs they do not appear in the published trade figures. They are nevertheless to be reckoned as costs to be recovered largely from export proceeds.

4. *Interest Charges on Industrial and Working Funds Supplied Outside of Alaska.* This includes three categories of loans: (a) current loans by banks, brokers and supply houses to cannerymen and fishermen for conducting fishing and canning operations, and

⁵ Wage payments to cannery workers and fishermen approximated \$71 millions from 1910 to 1919, and those to cannery and transport workers, without fishermen, \$183 millions from 1920 to 1935. Bower, *Alaska Fishery and Fur-Seal Industries* cited.

also by banks in the states to other commercial enterprises and industries in Alaska (chiefly wholesale establishments, fur traders and air transport concerns); (b) current extensions of credit to fishermen by marine outfitting houses in the states, chiefly in Seattle, for operating supplies and in some cases for ship equipment; and (c) long-term loans issued in the states against the permanent structures and floating equipment owned by fishery operators, transportation companies and various minor industries in the Territory. The amount of these annual interest charges is unknown but it probably runs to several millions of dollars. Short-time loans to the salmon cannery industry amounted to approximately \$10 millions in 1937, and on miscellaneous accounts to \$2 millions.⁶

5. *Insurance Payments in the States on Capital Equipment in Alaska.* These are also "chargeable" to Alaska; that is, theoretically they represent outpayments which match or take the form of some part of Alaska's exports. Undoubtedly their total amount to date is a considerable sum. It has been estimated that the insurance charge for the fishing and transportation industries alone amounts to several million dollars annually.

6. *Replacement Reserves of the Fishing Industries of Alaska.* These should also be taken into account in connection with the excess exports from the northern Territory. Reserves for depreciation may be currently invested in new operating properties (floating equipment, gear, canneries, etc.), in working capital (cash, supplies, etc.), or in paying off loans. The first investments in the fishery industries naturally gave rise to Alaskan imports in some degree. Considering their present age and composition, the total replacement "fund" today could easily amount to one half of original investments. In a sense, all of this sum was originally shipped south in the form of Territorial exports, principally fishery products. Only as replacements of the old plants and floating equipment and gear have brought imports through customs, have the trade statistics registered the maintenance of Alaska's industrial equipment out of export proceeds. The balance retained in the states cannot be reckoned as having brought material returns to Alaska but as representing unused replacement funds, amortization of loans, investments in properties in the states, etc. This

⁶ Seattle Clearing House Association.

applies to Alaskan-owned industries as well as those owned in the states.

7. *Governmental Expenditures.* In viewing Alaskan imports as a return on industrial costs of production paid out of export revenues, the item of government expenditures should be allowed for. Such expenditures may give rise to imports but they do not represent expenditures by industrial or mining concerns engaged in export business. The Alaskan economy presumably benefits from such expenditures, of course, and to the extent that they exceed internal tax collections they may be regarded as subsidy payments devoted to public purposes. The Federal government engages in a wide range of activities in Alaska, many of which involve purchases from the states.⁷ Among the customs shipments to Alaska has been the original government capital equipment used by the various Federal departments. Also included are equipment for the Matanuska colony, the Alaska Railway, and all government enterprises except as these involve merely interdepartmental transfers of equipment from the states⁸ or purchases of local supplies.

8. *Other Invisible Items.* These cover other items such as deposits, remittances and borrowings on the part of tourists, colonists, workers and business concerns requiring transfers of funds between the banks of the states and Alaska. When all such items are reckoned in, any net surplus would represent the profits of Alaskan industries invested in properties and bank balances or paid in dividends in the states and not returned to Alaska in the form of goods or reinvested in the Territory.

Alaskan Exports

Merchandise exports from Alaska to the United States, which represent the bulk of the industrial output of the Territory, increased progressively from \$10.2 millions in 1903, the date of the first official figures, to a peak of \$71.6 millions in 1918, or an increase of 600 per cent in 15 years. Following the World War they dropped to \$36.9 millions in 1921. Then occurred a rapid rise which attained a new high of \$73.3 millions in 1926. Follow-

⁷ See the annual numbers of the *Report of the Governor of Alaska to the Secretary of the Interior* (Washington).

⁸ Practice verified from the Seattle Customs Office files.

ing the general recession in business in 1929 a decline in American shipments began, which ended in 1932 with the low figure of \$30.2 millions—a decline of approximately 41 per cent from the level in 1926. The post-depression revival has been impressive, exports rising to \$62.3 millions in 1937.

In five-year periods from 1906 to 1938 average annual shipments to the United States, in millions of dollars, were as follows:⁹ (See Fig. 20 for annual data.)

1906-10.....	11.6
1911-15.....	21.9
1916-20.....	60.6
1921-25.....	50.7
1926-30.....	60.9
1931-35.....	37.6
1936-38.....	59.7

The quantitative growth in Alaskan merchandise exports from 1903 to the end of the World War was due mainly to the increasing output of the salmon and halibut fishery industries. The value figures, of course, also reflect rising price levels, especially in the late war years. From 1918 to 1927 the increase again consisted of shipment of fishery products. This was still chiefly salmon, but other fishery products also gained during this period.

The products making up the bulk of shipments from the Territory to the United States in recent years were, in the order of importance: fishery products (chiefly canned salmon), gold, furs and skins, and copper ore. (See Fig. 21.) During the past decade fishery products have generally accounted for more than four fifths of the value of the total shipments from Alaska to the United States. The following table shows the percentage of fishery exports to total Alaska exports year by year:^{10a} (See also Fig. 21.)

1926.....	80.0	1932.....	90.0
1927.....	72.0	1933.....	92.0
1928.....	81.0	1934.....	93.0
1929.....	75.3	1935.....	80.0
1930.....	78.8	1936.....	89.7
1931.....	87.0	1937.....	81.8
		1938.....	83.9

⁹ *Statistical Abstract of the United States*, cited, 1938. Data for 1938 were taken from *Monthly Summary of Foreign Commerce of the United States*, cited, Dec. 1938. It is from these sources that the trade figures throughout this discussion have been drawn.

^{10a} *Ibid.*

The decrease in the value of Alaskan exports as a whole from 1928 to 1933 may be explained as due mainly to two major causes: first, the fall in price of fishery products, fur skins and miscellaneous items. The physical volume of fish shipments to the

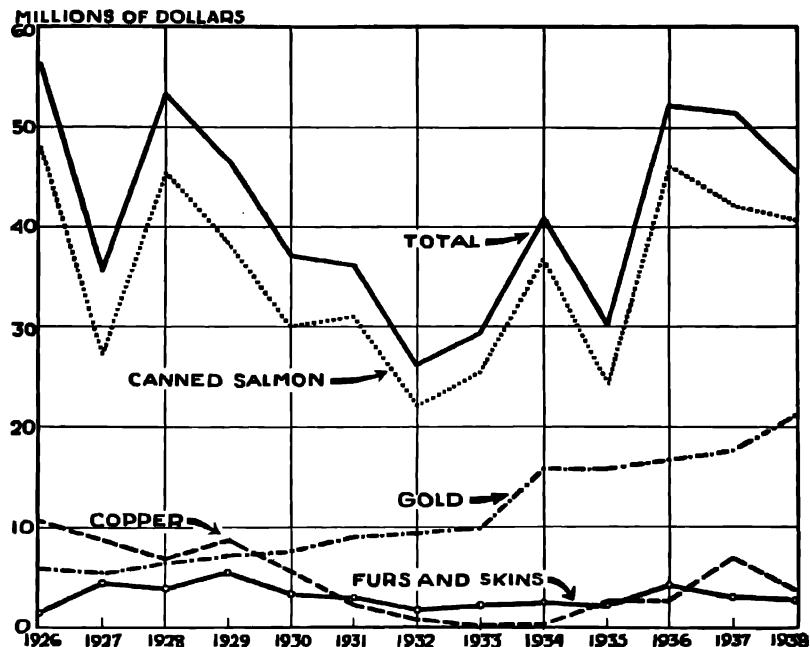


Fig. 21. Principal Alaskan Exports to the United States, 1926-38.

Source: U. S. Dept. of Commerce, Bureau of the Census, *Statistical Abstract of the United States*, 1938 (Washington, 1939), p. 563, for all years to 1937; U. S. Dept. of Commerce, Bureau of Foreign and Domestic Commerce, *Monthly Summary of Foreign Commerce*, Dec. 1938, for 1938 figures.

United States from 1928 to 1938 has been well maintained, dropping only slightly in depression years, as indicated in the following table (millions of pounds):¹⁰

1928.....	333.1	1933.....	297.8
1929.....	292.0	1934.....	386.0
1930.....	274.1	1935.....	285.1
1931.....	304.4	1936.....	447.7
1932.....	298.9	1937.....	351.9
		1938.....	373.9

¹⁰ *Ibid.*

The second reason for the decline in Alaskan exports was the diminution of copper production and exports. Shipments dropped from 79.2 million pounds in 1925 to 39,000 pounds in 1934, or from \$11,529,000 to \$4,000. By 1937 they had again risen to 47.7 million pounds valued at \$6,938,438, only to fall in 1938 to 36.5 million pounds with a value of \$3,792,367. Lead, silver, tin and miscellaneous mineral shipments likewise declined in depression years to 1932, as did those of minor products such as reindeer meat and animals, but rose again in the post-depression period.

Alaskan Imports

Imports of commodities into Alaska first assumed importance in the early 1900's. With only a slight let-down after the gold rush, they continued their upward trend until 1918, rising from a five-year average annual figure of \$9.8 million in 1896-1900 to a high of \$35.9 million in 1916-20, an increase of slightly more than 276 per cent. The depression figure (1931-35) dropped to the former low of 1921-25, but since then a recovery to an average of the middle 1920's has been attained. In five-year periods since 1906 the average annual shipments into Alaska from the United States have been as follows (in millions of dollars):¹¹

1906-10.....	17.2
1911-15.....	20.0
1916-20.....	36.9
1921-25.....	28.2
1926-30.....	32.7
1931-35.....	24.9
1936-38.....	41.6

Population trends as given in Census data are not sufficient to explain the changes in imports into the Territory, for, as noted previously, the total Alaska population was practically stationary from 1900 to 1930. However, a shift occurred in population to the first judicial division, comprising southeastern Alaska, which gives a clue to the chief determinant of Alaskan imports. Southeastern Alaska is the center of the important pink-chum salmon industry whose output of canned fish increased from the average annual figure of 880,000 cases (1906-09) to an annual output average of approximately 2.3 million cases (1910-30). In Fig. 22 it will be observed that a close correlation exists between the value of

¹¹ *Ibid.*

the salmon pack and the shipments of merchandise into the Territory. A considerable part of the shipments north each year are made by the fishing industry in the form of packing supplies, equipment for the canneries, and advances of wages in the form

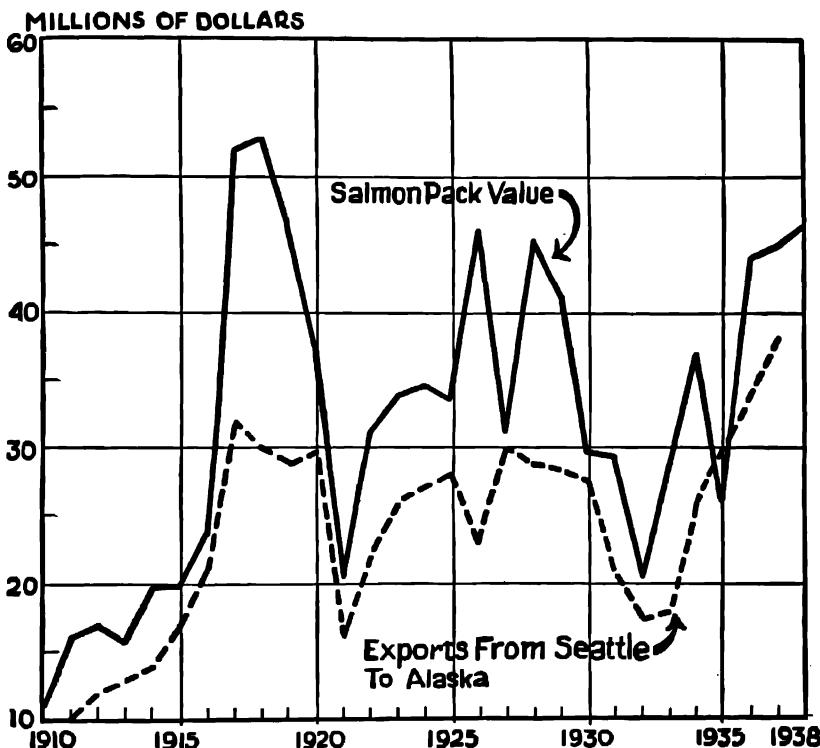


Fig. 22. Seattle Exports to Alaska Compared with the Alaska Salmon Pack, 1910-38.

Source: City of Seattle Harbor Dept., *The Port Warden's Annual Reports; Pacific Fisherman*, 1939 Yearbook, p. 79.

of food, clothing, etc. The difference between the costs of cannery items shipped north and the value of the pack consists largely of the value added by labor and other manufacturing expenses.

In the 12-year period from 1924 to 1935 the merchandise shipment into Alaska shows little fluctuation either as to total value or as to the individual classes of items save for the dip in depression years. From 1924 to 1930 there was little deviation from the aver-

age of \$31.8 million annually. (See Fig. 20.) In the depression the value dropped to a low of \$19.5 million, but the post-depression rise was above all former levels, due in part to increased activity of the fisheries and to the formation of the agricultural colony of Matanuska.

Three broad classifications include all goods imported into Alaska, over the past two and a half decades—namely, consumption goods, chiefly food; semi-fabricated iron, steel and wood products destined for use in general industry and construction; and raw materials such as tin plate and containers for use in the fishery industries.

In 1938, for example, the principal groups of commodities shipped from the United States to Alaska in order of importance consisted of (a) agricultural products, \$11.7 million; (b) machinery and vehicles, \$9.8 million; (c) iron and steel manufactures, \$8.8 million of which \$5.3 million represent tin cans and tin plate; (d) petroleum products and coal, \$4.3 million; (e) textiles including cordage and burlap, \$2.6 million; (f) wood and wood products including paper cartons, \$2.4 million; (g) miscellaneous, \$1.7 million; and (h) chemicals, drugs, etc., \$1.5 million.¹²

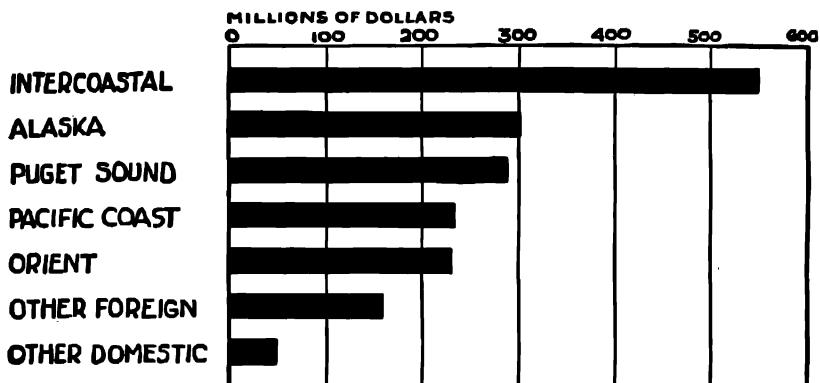
Tin products shipped from Seattle, which is the main shipping point for the cans used in the salmon canning industry, have exceeded \$3 million a year in value since 1923, and in 1937 rose to \$7.8 million. Another category of supplies consumed largely by the fishing industries is petroleum products. In 1938, a total of 45.8 million gallons of fuel oil, 9.4 million gallons of gasoline and 697.6 thousand gallons of lubricating oil were imported.¹³

One important change in individual commodities shipped to Alaska from the United States from 1925 to 1933 was in animal products, which dropped from \$5.3 million in the former year to a low of \$2.2 million in the latter, a loss of 60 per cent. Since that time this item has not recovered to the former level of the 1920's, owing in part, it is thought, to the increased production of Alaska livestock. On the other hand, upward trends are to be noted in the following groups: vegetable food products and beverages, metals and manufactures, and machinery and vehicles. The

¹² *Monthly Summary of Foreign Commerce of the United States*, cited, Dec. 1938.

¹³ *Ibid.*

EXPORTS



IMPORTS

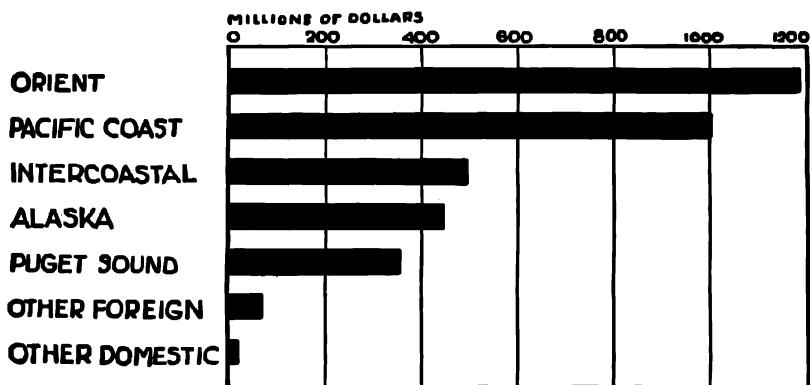


Fig. 23. Maritime Trade of Seattle, 1927-37.

Source: City of Seattle Harbor Dept., *The Port Warden's Annual Reports*.

latter increase may be accounted for on the basis of the new equipment used in colonization and to the increased activity in mining prospecting, as well as in the salmon fishery industry.

In 1905, imports of foreign origin were 11 per cent of Alaska's total purchases. Thirty years later this had dropped to approximately one per cent of the total. In 1904 Alaskan exports to foreign countries was 13.6 per cent of all merchandise exports, whereas in 1937 this percentage had dropped to six tenths of one per cent.¹⁴ In other words, the direct trade of Alaska with foreign countries, even Canada, is virtually nil, although, as related in Chapter X, foreign markets are of some importance in the final disposition of its fishery products.

ALASKA FISHERIES IN THE PACIFIC NORTHWEST ECONOMY

Maritime Importance of Alaska to Seattle

It will be apparent from the foregoing that the waterborne traffic of Alaska plays a large role in the maritime activity of the north Pacific coast of the United States. The relative importance of imports to Seattle from Alaska from 1927 to 1937 can be seen in Fig. 23. In 1937 Alaska products were third in order of regional importance. Principal import shipments of Seattle in that year, classified as to point of origin, were as follows (in millions of dollars):¹⁵

Pacific coast ¹⁶	\$82.7
Orient.....	54.3
ALASKA.....	52.2
Intercoastal.....	40.6
Puget Sound.....	29.2
Other foreign.....	10.7
Other domestic.....	4.0

The relative importance of Alaska in Seattle exports as compared with other domestic regions for the decade 1927-37 is shown in Fig. 23. This trade route has grown in importance since the depression. In 1937, as a matter of fact, Alaska held first place, as shown in the following table of Seattle exports (in millions of dollars):

¹⁴ *Statistical Abstract of the United States*, cited, 1938, p. 567.

¹⁵ *The Port of Seattle Yearbook*, 1937, pp. 78-79, 84-86.

¹⁶ Excluding Alaska and Puget Sound.

ALASKA.....	\$38.0
Intercoastal.....	36.5
Puget Sound.....	20.6
Other foreign.....	20.6
Orient.....	14.2
Pacific coast.....	13.1
Gulf.....	11.3
Other domestic.....	5.3

In the north Pacific Seattle occupies a dual position as the entrepot of Alaska trade and the fishery capital of the entire area. This port has the largest commercial interest in fishing banks of any city in the country. It is the home port and the chief outfitting center for the salmon fishing fleet and of the American halibut fleet of Alaska and Puget Sound, as well as of the coastal common carrier fleet that furnishes much of the transportation for the salmon canneries of Alaska. From 1911 to 1936 an increasing portion of the total Alaska commerce has cleared through this port. Seattle's share of total Alaskan exports during this period increased from a low point of 40 per cent in 1911 to a high of 97 per cent in 1932, with an average for the entire period of 66.4 per cent. Seattle as a port of origin claims an ever greater ratio of Alaskan imports; its share increased from 57 per cent in 1912 to 96 per cent in 1935. For the period extending from 1911 to 1936 Seattle accounted for 82.3 per cent of the total northbound shipment of \$750,000,000. Far outdistancing San Francisco and other ports in the Alaska trade, it has come to have an almost exclusive position.

The dominance of the Alaska fisheries in the commerce to and from Alaska has thus not only importance for other Alaskan industries dependent on the shipping lines, but also for Seattle, the Alaskan entrepot. A disappearance or diminution of productivity on the part of the fisheries of the Territory would have repercussions not only in the mines, the forest and the fields of Alaska but also along the Seattle waterfront.

Alaska Fisheries and the Pacific Northwest

It should be clear in the light of preceding discussion that the Alaska fisheries are organically related to the economy of the Pacific Northwest. Yet some recapitulation may nevertheless be appropriate at this point. The Pacific fishing banks extend geographically in an unbroken line from the Yukon southwards, as far as California, with the various districts in close competition

with each other. Moreover, as we have already observed, Seattle and San Francisco have always been the capitals of the Alaska fishery industries. Here, and in near-by ports, are to be found the offices of the principal companies; the centers of financing, outfitting and recruiting; the sources of supplies, and the primary markets for disposal of the final product. The Alaska salmon industry also constitutes the mainstay of the Alaska-Seattle trade, which is an important element in the maritime activity of Puget Sound, and at the same time depends itself upon the general transport system of this area. Finally, the Pacific fisheries dovetail with many other occupations in furnishing at least part-time employment for the huge army of migratory workers who seek a livelihood on the Pacific coast.

It is beyond the scope of this volume to analyze at length the regional economy of the Pacific Northwest. A few comparisons of the relative importance of the Alaska fisheries as a source of income, however, will serve to place those fisheries in their regional setting and to supplement the data on other interrelationships presented elsewhere in our study. They will indicate the relative contribution made by the fisheries industry to the prosperity of the Pacific rim.

The leading basic resource industries of Alaska and the Pacific Northwest, with the average annual value of their products in the period 1934-36, are shown in Table 24.

Table 24. Value of Output of Natural Resource Industries of Alaska and Pacific Northwest

(average annual value, 1934-36, in millions of dollars)

	Fish	Minerals	Timber	Agriculture
Washington.....	\$11.4	\$12.7	\$114.4	\$157.4
Oregon.....	3.9	4.3	66.1	102.7
British Columbia.....	15.7	48.4	25.8	37.2
Alaska.....	43.5	19.6	..	..
	<hr/> \$74.5	<hr/> \$85.0	<hr/> \$206.4	<hr/> \$297.4

Source: The figures for production in the mineral, timber and agricultural industries represent value of output, as officially reported. In the case of fishery products, except for British Columbia, it has been necessary to estimate the sales values since the Bureau of Fisheries does not eliminate the duplications in giving the value of fish products by states. The statistics of British Columbia exclude duplications and thus give the net values derived from all products as prepared for the market.

Fish products in the north Pacific totalled about \$75 million in annual value during the period 1934-36, of which Alaska contrib-

uted well over half. Neither in Washington nor Oregon are local fisheries of great importance, relatively speaking, but the Alaska fisheries are of significance to the entire area, and taken altogether the Northwest fisheries as a whole are one of the mainstays of the regional economy. To make more concrete the position of the Alaska fisheries we may note that their output (\$43.5 million) was exceeded by timber from Washington (\$114.4) and Oregon (\$66.1); Washington field crops (\$67.8) and livestock products (\$60.3); Oregon livestock products (\$50.2), and minerals from British Columbia (\$48.4). On the other hand, Alaska fishery products exceeded in value such leading specific commodities as Washington wheat (\$32.6), wood pulp (\$31.9), milk (\$29.2), and apples (\$22.1); Oregon milk (\$21.4), hay (\$16.4), wheat (\$10.0), fruit (\$10.0), and cattle (\$9.8); British Columbia timber (\$25.8), pulp and paper (\$17.4), gold (lode) (\$12.4), and lead (\$11.3).

It is upon the foregoing types of primary resource industries, among which fisheries rank fourth, that the economy of the Pacific coast commonwealths¹⁷ is based. Save as it has developed to supply limited quantities of consumer goods to local markets, manufacturing activity with a few noteworthy exceptions is restricted to processing locally produced raw materials, as in the case of food processors, sawmills, and smelters, or to the servicing of local industries like shipping. A relative sparsity of population discourages the growth of local fabricating industries on a large scale, while improved modern transport likewise also tends to foster continued dependence upon distant markets and centers of manufacturing. In addition, industrial development is held in check by a deficiency in important minerals—notably high-grade iron and other mineral deposits.

The Pacific Northwest, in other words, despite its rapid development and its recent transition to a more settled economy, is relatively close to the frontier stage of development, and, it may be added, has exploited its virgin resources up to very recent times with the abandon characteristic of the American frontier. As these

¹⁷ California, by comparison, is a larger, wealthier and more diversified state. Its fisheries, although occupying a relatively secondary place in its total economy, are almost as large as those of Alaska. Their average output in 1934-35 was valued at \$37.2 million. This was far exceeded, however, by mineral production (\$315.1 million), fruits (\$169.7 million), livestock products (\$145.0 million), field crops (\$141.0 million), truck crops (\$91.1 million).

primary resource industries from time to time have given outward manifestations of serious depletion, however, attention is being directed more and more to the problem of stabilizing their output. Timber production, which provided the major activity of the region for some decades, has tended in recent years to decline in relative importance, due in part to its rapid exploitation and also to changes in the construction demands of the country. The fishery industries to the extent that they respond to the recently adopted conservation programs will continue to play a role in the economy of the region, now undergoing the transition to a more settled form.

XVI

INTERNATIONAL FISHERIES PROBLEMS

THE INTERNATIONAL problems raised by the fisheries in the Pacific Northwest have already been examined as they concern Canada and the United States, the two countries which control the coastline of this region. (See Chapters IV and XIII.) It was found that independent national policies of conservation operating within a three-mile limit had proved ineffective in preventing the depletion of two important fisheries—the halibut and the Puget Sound-Fraser River sockeye. The salmon in its life habits is no respecter of political boundaries. Therefore, just as cooperation between regions within the United States had proved necessary, so joint action between the two nations of the Pacific Northwest had been found essential to keep exploitation of the fisheries within the limits which permit perpetuation of the fish supply. Two commissions are now functioning under international treaties. One has already achieved a significant measure of success in rehabilitating the halibut reserves, the other, more recently established, it is hoped will achieve a like success with the sockeye salmon.

If access to the fisheries of the Northwest were limited to Canadians and Americans, the problem would need no further consideration. And as concerns the major fisheries, access has been so limited until recently. There have been some Japanese operations in crab and cod fishing off Alaska, but these fisheries are of minor importance and attract little attention from the conservation point of view.

Recently, however, as has already been indicated, the international issue regarding the fisheries has been broadened. The question of alien participation in the important salmon and halibut fisheries has arisen. Depletion of the halibut reserves in the north Atlantic has caused European interests to consider the possibility of entering the carefully regulated Pacific fishery. The Japanese have also sought a foothold in the rich salmon fisheries of Bristol

Bay as part of their program for enlarging fishery activities, which in turn reflects the general expansionist economic pressures within Japan. Also motivating this action have been the limitation on the expansion of Japanese fishing in Soviet waters, and the general Soviet-Japanese friction regarding Japanese fishing operations in this region. Access to the fisheries of Northwest America by residents of countries thousands of miles away and in such a way that the fishing operations are outside the waters commonly adjudged to be territorial has now been made physically possible by technological advance. Accordingly, there arise new questions of national jurisdiction, rights and responsibilities as regards maritime resources.

The problem is two-fold. The question of conservation is involved and also that of competing national interests. Conservation measures controlling exploitation have been found necessary to prevent depletion; uncontrolled fishing is a menace to the fisheries. And unless the jurisdiction of the country carrying on these conservation measures extends to all locations where these fish may be caught, uncontrolled fishing is a possibility. Suppose, however, that the alien fishing interests were to join in the conservation program. Successful conservation might conceivably be assured; but the residents of the country originally monopolizing this particular fishery would have to restrict their fishing in proportion to the activity of the newcomers, if, as is usually the case, the area were already being fished to the margin of safety. In either case the fish returns to nationals of the country traditionally having sole use of the fishery would tend to be reduced.

This issue raises the question of jurisdiction. Can the United States and Canada claim jurisdiction over their halibut and salmon fisheries even outside territorial waters? There are those who think that such action is both possible and justified on the grounds of priority, and, in the case of the salmon, on the grounds that the fish spawn and are protected in their early life in the streams of the two countries. Whether such an attempt to claim jurisdiction would be upheld in a court of international law, however, is open to question. In any case it is not in accord with prevailing practice at present. Then there is the question as to what may be considered territorial waters. While the three-mile limit has not been generally accepted throughout the world, it is upheld by

England, Germany, Japan, Holland, several smaller states and the United States. The latter has also specifically recognized the three-mile limits in various fishery treaties. On the other hand a number of countries have claimed limits for their territorial waters variously in excess of three miles.

The question of state control over fisheries both in and adjacent to its territorial waters is not a new one. It has long been a matter of concern in European fisheries where the fishermen of many nations are active in seas of restricted size. In the north Pacific itself pelagic sealing raised the question of jurisdiction over the fur-seals, with their conservation the point at issue. In this case the United States was unable to uphold its jurisdictional claims over the seal herds when outside territorial waters and an international convention providing for a sharing of the catch was necessary to protect them.¹ Whales, too, are protected by international treaty.²

For the halibut and salmon fisheries, however, the problem is a new one. Traditionally their exploitation has been limited to nationals of Canada and the United States, with joint exploitation in the case of halibut and the Fraser River-Puget Sound sockeye. In the case of the other salmon reserves, fishing has been confined to nationals of the country owning the shore line. Attempts by foreign fishermen to enter these fisheries have provoked resentment, especially in view of the efforts which have gone into conservation. Recently the possibility of Japanese exploiting the Bristol Bay salmon has particularly excited alarm and has added its share of friction and exacerbation to the relations between Japan and the United States.

THE HALIBUT PROBLEM

Alien penetration of the halibut fishery appeared as a possibility in the winter of 1936-37, when it was reported that the *Thorland*, a British refrigerator ship manned by Norwegians, was preparing to come to the halibut banks of the north Pacific.³ The vessel was of the mother-ship type used in halibut fishing off the Greenland coast. Here the ship carries a number of small boats from which the actual fishing is performed. The fish are then refrigerated and

¹ 37 U. S. Stat. at L., p. 1542.

² U. S. Treaty Series, no. 880.

³ *Pacific Fisherman*, Jan. 1937, p. 11.

stored on the mother ship. These vessels have a wide radius of activity as well as a large storage capacity, and can land the fish in frozen form ready for the market after a trip of several months. The *Thorland* could have operated outside the control of the halibut commission with danger to the fish reserves. (See Chapter XIII.) It was feared, moreover, that this might be the entering wedge which ultimately might undo the careful rehabilitation work and destroy the fishery. As it turned out, however, the vessel never came, presumably as a result of the representations made by Canada to the United Kingdom.

Nonetheless this incident suggested that European fishing interests regarded the north Pacific halibut fishery as a possible field of exploitation. The halibut of the Pacific Northwest is the last great reserve of this fish and contributes over half of the entire world catch. Halibut reserves in other parts of the world have declined greatly as a result of overexploitation. They are centered mainly in the north Atlantic where operate the fishermen from England and Norway, the two countries besides Canada and the United States which are most active in halibut fishing. The halibut catch of the United Kingdom declined from 19 million pounds in 1932 to 14.4 million in 1936,⁴ and the commercial halibut landings as a whole from the north Atlantic banks, excluding those of the United States and Canada, fell from 34.6 million pounds in 1932 to 28.1 million in 1935, rising again to 31.2 million in 1936.⁵ The most productive grounds at present in this area are those in the Norwegian Sea and those off Iceland and Greenland. It is in the latter region that the large mother ships from Great Britain have been operating intensively with a resultant decline in the yield. The landings in British ports from Greenland in 1929 were more than 12 million pounds as compared with less than 4 million in 1936.⁶

It is only natural that, faced with a falling catch from the Atlantic banks which they have been exploiting, British fishermen

⁴ Figures taken from United Kingdom, Board of Trade, *Statistical Abstract for the United Kingdom*, no. 81 (London, 1938), p. 303, and converted to pounds at 112 pounds a cwt.

⁵ Conseil Permanent International pour L'Exploration de la Mer, *Bulletin Statistique des Pêches Maritimes des Pays du Nord et de L'Ouest de L'Europe* (annual), 1932-36 (Copenhagen).

⁶ Thompson and Van Cleve, *Life History of the Pacific Halibut* (2), cited, pp. 21-22; also *Bulletin Statistique*, cited.

should seek to enter the protected Pacific fishery. The means, moreover, are ready at hand in the form of the large refrigerator ships, which throw open banks formerly the exclusive preserves of neighbouring countries to the operations of nations half-way round the world. It is also natural that the Americans and Canadians should seek to prevent the entry of these foreign freezer ships capable of handling millions of pounds of halibut on one trip to the banks. Their potentialities for intensive fishing are large, and would endanger the conservation work, threaten the reserves and reduce the fish available for Canadian and American fishermen. It is possible that such entry by British ships can be permanently avoided by Canadian pressure on the British government and industry, and the 1937 enabling acts (see p. 241) have made foreign exploitation of the halibut banks more difficult. The essential question, however, still remains at issue.

JAPANESE ENCROACHMENT ON ALASKA SALMON

A temporary settlement has also been reached as regards the possibilities of Japanese encroachment in Bristol Bay, but again no permanent solution has been found. Moreover, this is the more serious problem in terms of the value of the fisheries at stake.

In 1936 Japan began a scientific investigation of the salmon resources in Bristol Bay, following agitation by Japanese fishing interests for government permission to fish for salmon with floating canneries in the north Pacific. This procedure was viewed by the American interests first with misgiving and then with considerable alarm when the catching and canning of Bristol Bay salmon by Japanese ships were reported in the following year on a scale out of proportion with purely experimental work.⁷ Labor groups bombarded Washington with requests for action. The canning interests were also active, and ultimately the Department of State took a hand in the matter.⁸

A provisional settlement was reached in March, 1938, when Japan, following representations from the United States government, halted its scientific investigation of Bristol Bay salmon and also declared that it would continue its former policy of not granting commercial licenses to floating canneries for salmon fishing in

⁷ *Pacific Fisherman*, July 1937, p. 29.

⁸ *Ibid.*

that region.⁹ The Japanese government also declared, however, that it was giving these assurances without prejudice to the question of rights under international law. The basic issue was not settled one way or the other. Various bills were introduced into the United States Congress extending American jurisdiction over the waters around Alaska in such a way as to control all fishing for salmon, but none has become law. There is some question, moreover, among international lawyers as to the advisability and effectiveness of such unilateral action on the part of the United States.

THE BACKGROUND OF THE CONTROVERSY

An adequate understanding of this controversy is impossible unless it is viewed against the general background of Japanese fishing industry and of the Asiatic salmon fishery in which both Japan and the Soviet Union participate. It was stated earlier that about 30 per cent of the total Pacific salmon catch is made on the Asiatic shore, as compared with 70 per cent on the American.¹⁰ This calculation was made several years ago, and the proportions may have changed somewhat in recent years; but it remains true that the bulk of the salmon reserves are to be found off the American and Canadian shores. On the Asiatic coast the bulk of the reserves spawn in Soviet streams. Japan has access to this source of supply by virtue of treaty rights granted in 1905, and cans a proportion of each year's total catch varying in amount from one half to two thirds.

Table 25 shows the distribution of the Pacific salmon pack in 1936 between the four countries involved.

Japanese Fishing Industry

At the same time Japan is the most important fishing country in the world, its total catch exceeding that of any other nation. It has large coastal fisheries and its fishing fleets appear throughout the waters of the Pacific. In 1936 the value of its coastal fishery catch was Y212,648,000, while the catch of its pelagic fisheries—trawling, whaling, and those offshore—amounted to Y84,484,000. Pisciculture brought a return of Y25,552,000, while the catch of

⁹ See pp. 296-97 for text of Agreement.

¹⁰ See p. 41.

Table 25. *Pacific Salmon Pack, 1936*

(in standard cases)

	Chinook or King	Blueback, Red or Sockeye	Silver or Coho	Pink	Chum or Keta	Steel- head Trout	Re- main- ders	Total
Soviet Union.....	2,820	102,982	37,724	195,002	247,809	2,424	6,285	595,044
Japan in Siberia.....	9,256	338,985	106,307	638,935	1,314	..	..	1,094,797
Japan proper.....	2,237	457,562	170,667	558,345	9,285	..	..	1,198,096
Total Japan.....	11,493	796,547	276,974	1,197,280	10,599	..	..	2,292,893
Total U.S. and Alaska	283,941	2,553,160	287,244	4,590,422	1,249,188	19,282	..	8,983,237
Total British Columbia	29,854	415,024	246,061	591,532	597,487	1,068	..	1,881,026
Grand Total.....	328,108	3,862,713	848,003	6,574,236	2,105,083	22,772	6,285	13,752,200

¹ Including Japanese floating canneries operating off the shores of Kamchatka.

Source: *Pacific Fisherman*, 1938 Yearbook Number, pp. 67, 69, 81. When it is realized that even of the 1,198,096 cases accredited to Japan proper nearly 300,000 were put up on floating canneries operating in the waters off Kamchatka, it can be seen that Japan obtains the larger part of its salmon pack from the Soviet reserves. It is the poorest of the four countries as regards salmon supply. The United States, it may be observed, accounts for 61.3 per cent of the total pack.

fishermen from Japan in the territorial waters of Chosen, Taiwan and Kwantung was valued at Y4,064,000. The catch value of what is termed "fisheries in foreign regions" is not available, but the value of manufactured products from the fisheries in Soviet waters amounted to Y35,489,000, and that of the floating canneries for salmon, crab and whale to Y27,908,000.¹¹ The total value of these various fisheries in 1936 has increased but slightly from that ten years previously. The returns on recently developed salmon and whale floating plants were offset to some extent by declines in other fields.

The number of persons engaged in all branches of Japan's fishing industry in 1936 reached the impressive total of 1,534,432, of which 1,102,502 were engaged in fishing, 154,627 in pisciculture, and 277,303 in manufacture.¹² The total represents an increase of about 80,000 since 1926, not quite 6 per cent. Fishing vessels and boats also showed an increase in the same period from 250,934 to 366,267, with the largest increase in motor vessels and a decrease in those without engines.¹³

Reports of Japan's fishing industry indicate that increased activity of Japanese fishing has taken place and is expected to continue to do so in waters away from Japan. "Large-sized vessels with

¹¹ Japan, Ministry of Agriculture and Forestry, Section of Statistics, *Statistical Abstract* (annual), 1936-37 (Tokyo, 1938), pp. 135-61.

¹² *Ibid.*, pp. 130-33.

¹³ *Ibid.*, pp. 133-35.

motors have increased greatly in number of late. There are over 10,000 vessels of over 10 tons, many of which are actively engaged in fishing at distances of up to 700 miles from Formosa and Japan proper. The northern seas have been opened up by floating crab canneries, and mother vessels for the salmon and salmon trout fisheries. But there are still vast undeveloped areas in the Bering Sea, the Sea of Okhotsk, the Maritime province waters, the South Seas, the South China Sea, the Gulf of Siam, and even in the Southern Pacific, so that the future for pelagic fishery for Japan is bright and of great importance to her."¹⁴ Current information reports Japan active in Mexican, Argentine and Philippine fisheries. Japanese vessels are also reported off Australia and in other southern localities.¹⁵

Japan's fisheries are of considerable importance in the national economy. As already noted, they are a source of employment for more than one and a half million persons. The significance of fish in the national food supply is so well known as not to require emphasis. Marine products are also of importance in foreign trade. Recent information on what proportion of Japanese exports are to be credited to the fisheries cannot be obtained as the usual trade reports do not include shipments made to foreign markets directly from the concession fisheries on Kamchatka. In 1935, however, the latest year for which the value of these shipments is available, the total value of Japanese exports of marine products was Y100,903,000, representing about 4 per cent of total Japanese exports.¹⁶ In the same year about one fifth of the value of all fish and shellfish imported into the United States came from Japan, the value amounting to \$5,741,054.¹⁷

The above figure of Y100,903,000 represented considerable increase over 1930 exports of aquatic products, which were valued at Y71,089,000.¹⁸ Most of the increase came in canned and bottled fish. Canned salmon, apart from the exports direct from Soviet

¹⁴ *Japan Yearbook*, 1937 (Tokyo, 1937), p. 500.

¹⁵ For an interesting consideration of Japanese fishing activity in south Asia see Albert W. C. T. Herre, "Lessons from the Fish Markets of Calcutta," *The Current Science*, Dec. 1937, pp. 264-65.

¹⁶ Mitsubishi Economic Research Bureau, *Japanese Trade and Industry, Present and Future* (London, 1936), p. 191.

¹⁷ U. S. Dept. of Commerce, Bureau of Foreign and Domestic Commerce, *Foreign Commerce and Navigation of the United States*, cited, 1935, pp. 6-7.

¹⁸ Mitsubishi, cited, p. 191.

waters, increased from 4 to 16 million yen from 1930 to 1935. Exports from Soviet waters, which are reported as entirely canned salmon, were as follows, in thousand yen:¹⁹

1930.....	20,123
1931.....	11,734
1932.....	15,922
1933.....	12,813
1934.....	21,605
1935.....	13,700 ²⁰

Thus Japanese canned salmon exports in 1935 composed 30 per cent of the value of all fish exports. By far the greater part of Japan's salmon pack goes to foreign markets, primarily to Great Britain where it competes with Canadian and United States exports. (See Chapter X.)

Japanese Fishing in Soviet Waters

As already pointed out, Japan's important salmon fishing is only partly carried on in waters of the country itself. Salmon is canned in the Kurile Islands, in Hokkaido, in Karafuto, and at the northern end of Japan proper. It is from Soviet waters, however, and those adjacent, that the greater part of the supply comes. Knowledge of the working of these concession fisheries is important for an understanding of the Japanese-American salmon controversy.

The question of Japanese fishing in or near Russian waters goes back well into the last century. In the Russo-Japanese Treaty of 1875, by which Russia exchanged the Kurile Islands for Sakhalin, the Japanese were given most-favored-nation treatment regarding fishing off Kamchatka. In the Treaty of Portsmouth following the Russo-Japanese War the Japanese obtained the right to fish in Russian waters along the Pacific coast, and methods for exercising the right by lease of fishery lots were provided in the Convention of 1907. When this expired in 1919, Japan continued fishing without benefit of formal agreement until 1924, when a temporary agreement concerning fishing rights was signed by the two countries pending conclusion of the treaty in which Japan recognized the U.S.S.R. By the terms of this treaty, signed in January, 1925, the Portsmouth Treaty was held to be still in force and the Soviet Union specifically recognized Japan's right to fish in its waters. It

¹⁹ *Ibid.*

²⁰ Estimated.

was agreed that the two countries should work out a new fishery convention and this was finally completed and signed in 1928. The annual auctioning of the fishing lots which had been a feature of the earlier convention was continued. Fishing in the mouths of rivers and in the streams themselves was restricted to Soviet citizens, and some 37 bays and gulfs were likewise exempted from the provisions of the Convention.

Considerable friction arose between the two countries over the method of payment for the leases, the auction system, poaching, etc. Two supplementary agreements were necessitated: one in 1931, fixing the exchange rate at which the rents were paid at 32.5 sen per ruble; and one in 1932 permitting Japanese nationals to secure around 280 lots without going through the auction process. When the time came for the Convention to be extended or revised Japan expressed a desire for revision. A new and presumably more satisfactory agreement was worked out, but it failed to secure Soviet signature following the publication of the Japanese-German "Anti-Comintern Pact" in 1936. Subsequently a working arrangement was provided by twice extending for one year the 1928 Convention and the supplementary agreements.

In 1939 for the first time the year began with no working arrangement. The fishery question is entangled in the general mesh of Soviet-Japanese relations, which have grown progressively more strained since the end of 1936. While not denying Japan's rights to fish in its waters, the Soviet Union was not willing to conclude a new long-term agreement and also refused simply to extend the old one in 1939 as in previous years. A new temporary agreement was offered which restored the general auctioning of the fishing lots and closed about 40 grounds for strategic reasons. Japan for a long time refused to accept these terms and the opening of the season was in sight with no agreement as to how Japan should exercise its fishing rights. Finally at the beginning of April the agreement was signed.²¹ Thirty-seven lots were closed, but 10 additional ones were made available to the Japanese, and while the auction process was reestablished, Japan was guaranteed against an increase of more than 10 per cent in rents. Moreover for a large number of lots the question was settled for 5 years, as that is the term of

²¹ *Izvestiia*, April 4, 1939.

the lease for lots worked not less than 3 years, according to the 1928 Convention.

Considerable friction has thus attended Japanese operations in Soviet waters. Moreover the limit of Japanese expansion in these fisheries seems to have been reached. Soviet fishing has noticeably increased, and Japan's relative share has declined. This decline took place chiefly prior to 1932, as is reflected in the following statistics on the number of salmon-fishing lots obtained by the Japanese and the percentage of the total number of lots which this represents:²²⁻²³

	Number of Lots Leased to Japanese	Per Cent of Total
1924.....	229	88
1928.....	239	86
1929.....	274	65
1930.....	296	55
1931.....	288	52
1932.....	371	58
1933.....	340	52
1934.....	369	53
1935.....	378	50
1936.....	382	..
1937.....	374	..

Table 26 gives a more complete picture of Japanese fishing in Soviet waters.

These data do not take into consideration the operations of floating factory ships. It was in 1914 that the Japanese first tried the experiment of canning crabs aboard a ship. By 1930 the crab-canning floaters belonging to the Japanese had reached their maximum number of 19; subsequently the number dropped following a consolidation of the fishing companies. In 1927 the technique was tentatively applied to salmon. Salmon floaters belonging to the Japanese and operating in the northern waters increased from one in 1929 to 19 in 1933, then decreased to 6 by 1936. This reduction was not paralleled by a similar drop in the number of small boats used in conjunction with the mother ship and, indeed,

²²⁻²³ From annual numbers of *Japan Yearbook*, cited, for years 1924-34; figures for 1935 from *Trans-Pacific*, Dec. 26, 1935 p. 13; for 1936 and 1937 the number of lots was obtained from *Oriental Economist* (Japanese edition), Feb. 11, 1939, p. 18. Percentages for 1936 and 1937 are not available. The Japanese also obtain a number of crab-fishing lots which are excluded from consideration here as not pertinent.

Table 26. Japanese Fishery Operations in Soviet Waters, 1927-36¹

	1927	1930	1933	1936
Fishing Lots²				
Lots leased from U.S.S.R.				
(no.)	255	318	357	399
Lots worked for the year (no.)	248	292	350	376
Fishing Vessels				
Steamships (no.)	241	252	174	152
" (tonnage)	303,526	442,067	330,062	360,653
Sailing ships (no.)	41	6	1	1
" " (tonnage)	9,423	1,583	525	525
Fishermen (no.)	20,552	22,227	17,506	21,208
Total fish catch (1,000 lbs.)	97,793	196,141	105,083	188,940
Crab catch (no.)	8,788,384	4,846,962	2,546,331	6,565,368
Fishery products prepared (yen)	27,089,306	31,829,383	23,666,332	35,488,857
Salt-cured (yen)	7,121,968	9,511,527	7,567,889	13,098,733
Canned (yen)	18,721,874	20,847,275	14,588,106	20,197,700
Crab (yen)	4,875,561	2,395,852	1,168,955	2,609,828
Salmon (yen)	13,846,313	18,451,423	13,419,151	17,587,872

¹ Excluding floating factory ships.² Including crab-fishing lots.Source: Japan, Ministry of Agriculture and Forestry, Section of Statistics, *Statistical Abstract, 1936-37* (Tokyo, 1938), p. 155.

the total output almost doubled in the period. Table 27 shows the trend.

Table 27. Japanese Floating Salmon Canneries, 1929-36

Mother Ships	Number	Ton-nage	Accompanying Boats	Output		
				Volume (1,000 cases)	Value (1,000 yen)	Total ¹ (1,000 yen)
1929...	1	999	2	..	..	6
1930...	6	12,517	43	15,791	339	501
1931...	10	20,486	73	66,847	1,145	1,225
1932...	13	15,365	111	70,236	2,078	2,695
1933...	19	28,978	185	150,653	3,426	5,175
1934...	16	32,655	305	272,766	8,050	10,238
1935...	8	29,456	250	312,985	7,785	10,129
1936...	6	20,467	170	286,157	7,409	9,691

¹ Including salt, cured, refrigerated, etc.Source: Japan, Ministry of Agriculture and Forestry, Section of Statistics, *Statistical Abstract, 1936-37* (Tokyo, 1938), pp. 158-61.

The operations of these boats, using nets several miles in length to catch salmon in the ocean waters as they head toward the streams of Kamchatka, caused concern to both Japanese and Soviet shore canners. The danger of their permanently injuring

the salmon runs was soon clearly recognized. The Japanese interests consolidated several companies engaged in this deep-sea fishing into one concern controlled by the Nichiro Fishery Company. Since Nichiro also exercises a virtual monopoly of the shore salmon fishing by Japanese in Soviet waters, the two competing techniques are now under single control. The Japanese government was instrumental in effecting this consolidation. In 1934 a government permit system for the floating canneries also was instituted, and thereafter their number was reduced.

The problem of control has been further complicated by the fact that salmon deep-sea fishing, with the canning done on shore, is also carried on off the Kurile Islands. A natural step has been the move to bring these Kurile fisheries into the administration of the central government rather than have them remain under the authority of the local government of Hokkaido. They also have been amalgamated into one concern in which again Nichiro has a dominant position. Thus recent years have brought a rapid centralization of control in the Japanese salmon fisheries hand in hand with the evolution of new fishing techniques.

Japan's attempt to enter the Bristol Bay salmon fishery can thus be seen as part of a general process of fishery expansion. Canned salmon, moreover, is largely an export product and the English market, which takes the major part of Japanese exports of this commodity, demands primarily the red salmon for which Bristol Bay is the world's main source of supply. Japan is also dependent for a large part of its present salmon on Soviet fishery concessions, and expansion therein is limited. A new technique has been developed whereby the fish may be caught and canned on the high seas, but such operations on Asiatic shores are limited by the interests of the shore canners. This was the background of the Bristol Bay episode.

JAPAN AND BRISTOL BAY

Toward the end of 1935 Japanese fishing interests requested their government to grant licenses for floating canneries to operate off Alaska. No such licenses were issued, however. Then in May, 1936, a petition was introduced into the Diet calling attention to the size of the Alaska salmon pack, and expressing the hope that the Japanese might fish in these waters. The government was urged

to grant "permission for the salmon fishery on the mother ship system to operate on the north Pacific Ocean."²⁴ In the spring of the same year the Japanese Diet passed an appropriation of Y89,000 for investigating "the fishing resources in the Alaska waters, where it is stated there is an opening for salmon and trout fishing."²⁵ The investigation was to be conducted for three years. In 1936 a scientific ship came to Bristol Bay under the provisions of this grant and some salmon was canned experimentally.

This proceeding was observed with considerable alarm by fishing interests of the American Northwest, both by cannery operators and labor groups. The feeling was intensified in the spring of 1937 when representatives of a Japanese can company approached the canning industry in Seattle with a proposition for American and Japanese capital to join in open-sea canning of Alaska salmon, using Japanese equipment and the cheap Japanese labor. The offer was rejected.²⁶

The Bristol Bay situation was called to the attention of the United States Bureau of Fisheries and the Department of State. For the time being, however, no action was taken. In the summer of 1937 reports from Alaska told of the presence of Japanese boats engaged in canning salmon twenty to thirty miles from shore. Inquiries in Japan elicited the information that no licenses had been granted by the government for salmon mother-ship operation off Alaska. After a series of contredépôts between the fishery groups and the Bureau of Fisheries, the Department of State took the matter actively in hand and the question became one for diplomatic discussion and negotiation between the State Departments of the two countries. Throughout 1937 the West Coast fishing interests were extremely active with protests and recommendations. Labor unions bombarded Washington with telegrams and reso-

²⁴ *Pacific Fisherman*, July 1936, p. 24.

²⁵ *Japan Weekly Chronicle*, June 4, 1936, p. 717.

²⁶ *Pacific Fisherman*, Mar. 1937, pp. 9-11. The profitability of operating a floating cannery at considerable distance from its home port is greatly influenced by the factor of cheap labor. A comparison of canned salmon production costs between Japan and the United States awaits further study, but it is well known that Japanese wages are but a fraction of American, and there is evidence that labor costs in fisheries are substantially lower as a result. The industry is apparently not one of those in which the comparative American advantage in mechanization and organization is such as to make possible the maintenance of a relatively high wage scale in direct competition with lower-paid labor abroad.

lutions. The Maritime Federation of the Pacific, with which most of the unions are affiliated, considered a boycott of Japanese goods and an embargo on Japanese freight, but delayed action while the Department of State was carrying on negotiations.

Meanwhile several bills were introduced in Congress. Mr. Anthony J. Dimond, the delegate in Congress from Alaska, introduced a bill (H.R. 7552) in the House of Representatives on June 17, 1937 to protect the salmon fisheries, and Senator Homer T. Bone of Washington introduced one in the Senate on June 15 (S. 2679). On November 15, Mr. Dimond brought forward another bill (H.R. 8344) supplanting his earlier one and identical with the Senate measure. Hearings on this proposal were held in Washington in February, 1938, with American salmon interests urging action by the government.²⁷

The Dimond bill, H.R. 8344, declared the salmon "spawned and hatched in the waters of Alaska" to be the property of the United States, and made it unlawful for the fish to be caught in waters adjacent to Alaska except under the regulations of the Secretary of Commerce. Jurisdiction of the United States was made to extend to all the waters adjacent to the coast of Alaska with a depth less than 100 fathoms, lying east of the international boundary line between the United States and the U.S.S.R., which the President had found or declared salmon-fishery law-enforcement areas. These areas were to be declared wherever vessels were found to be hovering with the intent of catching salmon en route to the rivers of Alaska. No action has been taken by Congress on this measure. On May 5, 1938, however, another bill (S. 3744) was introduced by Senator Royal S. Copeland of New York. This measure extended the territorial jurisdiction of the United States to the continental shelf around Alaska east of the international boundary, the edge of the shelf having a depth of water of 100 fathoms more or less. While the Dimond and Bone bills asserted American property rights in the Alaska salmon, this bill found its rationale in the geological concept of the shallow waters of the Bering Sea as a slightly submerged margin of the American continent, rather than a true continental shelf. These measures all represent proposals to deal with the situation by the legislative

²⁷ *Alaska Salmon Fishery, Hearings . . .*, cited.

assertion of American rights, but none has yet been enacted into law.²⁸

Meanwhile the diplomatic negotiations of the Department of State had borne fruit in an informal agreement on the part of the Japanese government to terminate its investigation of Bristol Bay and not to license floating salmon canneries for operation in that region. In November, 1937, the United States government had presented a statement to Japan calling attention to Japanese activities in connection with Bristol Bay salmon. It summarized the efforts of the United States to conserve and develop the salmon resource, and declared that these efforts "would in a comparatively short period be completely nullified" if foreign nationals carried on fishing in offshore waters by methods more effective than those used by American fishermen. The importance of the Alaska salmon industry for the economy of the Territory and the Northwest was stressed. It was pointed out that whereas Bristol Bay received particular emphasis, nevertheless any solution for the situation should cover not only Bristol Bay but all the principal American salmon-fishing waters adjacent to Alaska. The statement concluded as follows: "Having in mind the high importance of the Alaska salmon fisheries as an industry fostered and perpetuated through the efforts and economic sacrifices of the American people, the American Government believes that the safeguarding of these resources involves important principles of equity and justice. It must be taken as a sound principle of justice that an industry such as described which has been built up by the nationals of one country cannot in fairness be left to be destroyed by the nationals of other countries. The American Government believes that the right and obligation to protect the Alaska salmon fisheries is not only overwhelmingly sustained by conditions of their development and perpetuation, but that it is a matter which must be regarded as important in the comity of the nations concerned."²⁹

On March 25, 1938, the following statement was issued by the Department of State:

"As a result of discussions between the American Government and

²⁸ At the beginning of 1939, bills presented by Mr. Dimond and Senator Bone similar to the earlier ones were again before Congress. H. R. 883, H. R. 3661 and S. 1120.

²⁹ The official summary of the statement is given in Appendix A, pp. 303-308.

the Government of Japan in regard to the salmon-fishing activities of Japanese nationals in the offshore waters of Alaska, especially in the Bristol Bay area, reported during the past fishing season, the Japanese Government has given, without prejudice to the question of rights under international law, assurances as follows: (1) that the Japanese Government is suspending the three-year salmon-fishing survey which has been in progress since 1936 in the waters in question; (2) that inasmuch as salmon fishing by Japanese vessels is not permitted without licenses from the Japanese Government and as the Government has been refraining from issuing such licenses to those vessels which desired to proceed to Bristol Bay area to fish for salmon, it will, on its own initiative, continue to suspend the issuance of such licenses; that in order to make effective this assurance the Japanese Government is prepared to take, if and when conclusive evidence is presented that any Japanese vessels engage in salmon fishing on a commercial scale in the waters in question, necessary and proper measures to prevent any such further operations. . . .

"In view of the above assurances it is evident that if ever Japanese vessels, which were present in the waters in question to engage in crab fishing or in production of fish meal, caught salmon in commercial quantities in the past, such fishing was conducted without the knowledge of the Japanese Government.

"Furthermore, these assurances of the Japanese Government are regarded as regulating the situation until such time as the problems involved may call for, and circumstances may render practicable, the taking of other measures.

"The American Government will continue to give constant and practical attention to the question of the Alaska fisheries and the question of ways and means to insure the protection and perpetuation of the highly important food resource and industries involved. To this end the fullest possible collaboration of the appropriate agencies of the Government will be utilized. In accordance with this objective, and for the general purpose of removing cause for apprehension on the part of American fishing interests, the Bureau of Fisheries and the Coast Guard will continue to be charged with the duty of observing fishing activities in Alaskan waters."³⁰

Thus the immediate threat, as the American and Canadian fishing interests envisaged it, was relieved. Without prejudice to the question of its legal rights, the Japanese government suspended the Bristol Bay investigation and promised to issue no floating cannery

³⁰ U. S. Dept. of State, *Press Releases*, Mar. 26, 1938, p. 412.

licenses for this area. Moreover, while disclaiming any knowledge of past operations, it declared it would take measures against any boat proved to be so operating. No permanent solution was provided, however, although the agreement has been thus far observed.

The feasibility of the Japanese catching the Bristol Bay salmon with their large nets before the fish arrive at spawning streams, even before they reach American gill-net areas, is generally conceded both by the Americans and by the Japanese, and there is no question of the serious results, in terms of overfishing and international conflict, to which this activity could lead. American fishery interests feel that United States ownership of the salmon fishing rights must be definitely recognized by Japan before the settlement of the question can be considered final. This question of fishing rights under international law was specifically exempted from consideration by the Japanese government when it undertook to restrain Japanese nationals from operating floating canneries in Bristol Bay. The United States government has been silent on the point, although it has given assurance that it "will continue to give constant and practical attention to the question of the Alaska fisheries and the question of ways and means to insure the protection and perpetuation of the highly important food resource and industries involved."³¹

NEED FOR A PERMANENT SOLUTION

This then was the situation in the spring of 1939. It was evident that entry into the Bristol Bay salmon fisheries by Japanese interests was technically possible and would fit in with Japan's general program of expanding its fisheries. The alarm in the United States had induced the Department of State to take a hand in the matter and a provisional agreement restraining such activity had been arrived at "until such time as the problems involved may call for, and circumstances may render practicable, the taking of other measures."³² When the agreement was negotiated, the United States was in a favorable position diplomatically as regards Japan, as the latter country was deeply involved with the war in China in which the neutrality of the United States was of cardinal import-

³¹ *Ibid.*, p. 419.

³² *Ibid.*, p. 412.

tance. It was obviously to Japan's interest to avoid making an issue over fishing rights which would have imposed further strain on diplomatic relations already tense.

How a permanent solution may be reached lies beyond the bounds of this study, for it involves questions of international law and diplomacy.³³ What is the legal basis for asserting American control over salmon fishing in extraterritorial waters? Can it also be extended to justify a demand for American fishing monopoly? If not, does that mean that the conservation work of a generation is to be set at nought and a prosperous industry ruined by the invasion of foreign fishing interests? It is obviously desirable to settle the question amicably with statesmanlike restraint, yet it presents a direct clash of national interests, set against a controversial legal background.

From the American standpoint the matter is complicated by the fact that the traditional position of the United States in fisheries contentions is ill-suited to its interest here. A brief report on the legal aspects of the Pacific fisheries dispute by a committee of the American Bar Association³⁴ notes that "it has been a persistent contention of the foreign offices of Great Britain and of the United States that by international law the control of foreign states over their coastal fisheries is limited to territorial waters and that territorial waters in general do not extend seaward beyond three geographical miles from low water mark." Japan, Germany, Holland and several smaller states have also held to this view, and the members of the British Commonwealth of Nations presumably support it. Most of the other nations with valuable coastal fisheries, however, are in opposition.

Experts believe the three-mile limit is inadequate to protect coastal fisheries; yet common cooperative measures by international treaty would seem impractical judging by the vain efforts

³³ A forthcoming volume by Stefan Riesenfeld gives an exhaustive analysis of the international law, state practice and scholarly opinion in relation to maritime fisheries. See also Joseph Walter Bingham, *Report on the International Law of Pacific Coast Fisheries* (Stanford University, Calif., 1938); and Philip C. Jessup, "The Pacific Coast Fisheries," *The American Journal of International Law*, Jan. 1939, pp. 129-38.

³⁴ Report of Sub-Committee on Pacific Coastal Fisheries, American Bar Association, *Advance Program of the Sixty-second Annual Meeting* (San Francisco, 1939), pp. 69-71. Members of the Sub-Committee were Judge Justin Miller, Chairman, Philip C. Jessup, Joseph W. Bingham.

over almost a hundred years to prevent the ruin of the fisheries in the North Sea. The legal question seems to hinge largely upon whether circumstances in the north Pacific require the application by the United States of the doctrine of protection of vital interests. The application of this doctrine to maritime fisheries would be a new one for the United States and the American historical position respecting the coastal fisheries of other nations is embarrassing.

The situation as regards international law is summarized in the Bar Association report as follows:

"(1) The question of control over coastal fisheries is not identical with that of the extent of territorial waters as a part of the domain of the state.

"(2) The United States, and many other countries, always have insisted upon a distinction between the limit of territorial waters as part of the domain of the state, and the power of a state to take action on the high seas adjacent to territorial waters for the protection of its vital interests.

"(3) The United States has not in the past applied this doctrine of protection of vital interests on the adjacent high seas, to the question of conservation of fisheries, but other states have done so and many states of the world claim a right to regulate offshore fisheries outside of the three-mile limit.

"(4) The extension by the United States Government of the doctrine of protection to cover the case of the Alaska fisheries could be justified also on the basis of the special status of that fishery and of the long period of time during which the United States has developed the fishery and preserved it from extinction.

"(5) From the diplomatic point of view, the position of the United States is difficult because of the positions which the Government has taken in the past and because of the powerful prestige of Great Britain's concurrent support of similar positions."

If it be granted that the Alaska salmon interests are vital to the United States and should be protected, there still remains the question whether this should be attempted by independent fiat, diplomatic negotiation, treaty or arbitration. Unilateral action such as that proposed in various bills introduced in Congress (see above) has been strongly attacked³⁵ on the grounds that these measures contradict international law as the United States government has

³⁵ Jessup, cited.

often proclaimed it. Joseph W. Bingham stresses the necessity for diplomatic skill and champions the exercise of governmental power beyond the three-mile limit when necessary to protect fisheries against damage. He maintains that to establish this as law requires only "its assertion by a powerful state on behalf of a clearly just claim, and skillful diplomatic support of the assertion,"³⁶ but he counsels against any attempt at arbitration.

Whatever solution may eventually be reached, all experts agree on the necessity of some action in the interests of conservation. The question of alien penetration into salmon or halibut fisheries is not merely one of conflicting national interest, although that element is clearly present. It represents also the continual conflict between technological advancement and conservation. From the native Indian salmon spear to a Japanese floating cannery is a long jump and represents a considerable advance in the technology of securing and preserving of salmon. In the course of the process, the existence of the salmon runs has been threatened as man has become more adept in exploiting the fish to his profit. To preserve the resources and to put it on the basis of perpetual returns has necessitated controlling this exploitation. It forces man to be moderate today that he may also profit tomorrow.

In parts of the salmon fishery this control has been successfully applied, as in Alaska. In other sections, such as California, the salmon seems to be on the way to extinction. In the case of the Fraser River sockeye, it appears that after a delay effective control will be instituted under the Sockeye Treaty of 1937. Thus the problem of control has not yet been adequately solved even within the limits of Canadian-American interest in this one fishery. And there are other fisheries on the coast where requisite control has yet to be applied.

Fisheries constitute a national and world resource in terms of food. They also represent the base for a structure of livelihoods and interests with ramifications running out into a hundred related industries. Adequate protection for them is an obvious necessity. The clash of fishing interests in regard to Alaska salmon in recent years has served to call attention to the changed condition of fisheries in general which now lie open to exploitation from considerable distances. Inasmuch as conservation calls for powers of

³⁶ Bingham, cited, p. 41.

control, the question of right of exploitation and the onus of preserving individual fisheries must be clearly established. To which may nations lay sole claim and in which must profit and responsibility be shared? Germane to answering these questions will be the factors of priority in the field, the conservation measures already carried on, size and extent of the industrial structures based thereon, and the general relation to national economies. The aim of this study has been to elucidate some of these factors in relation to the salmon fisheries of Alaska and the American Northwest.

APPENDIX A

UNITED STATES NOTE TO JAPAN NOV. 22, 1937

Summary of the Statement made on November 22, 1937, by the American Government to the Japanese Government in connection with the Alaska Salmon-Fishery Situation.

"Beginning in 1930, and in every year since then, there have been present in the Bristol Bay area of western Alaska during the salmon-fishing season Japanese fishing fleets made up of floating canneries and auxiliary vessels varying in type from small motorboats to Diesel-powered trawlers. As long as the activities of these vessels were confined to the taking of crabs which abound in the Bering Sea they gave the American Government no cause for serious concern. Recently, however, evidence has accumulated which indicates that the Japanese fishing vessels operating in Bristol Bay are engaging in salmon fishing, thus raising the question of the protection and perpetuation of the salmon resources in these and other Alaskan waters.

"In this connection the following trend of events is noteworthy: In 1936 the Japanese Government announced that a three-year fishing survey of the salmon resources of Bristol Bay would be undertaken. Two years of the survey have been completed and a third year will carry it through the 1938 fishing season. The regular appearance in Bristol Bay of the fishery-survey vessels, coupled with the operations of Japanese fishing fleets, has caused deep concern among large sections of the American public with regard to the object and significance of such activities.

"Now reports from reliable sources have become increasingly numerous that Japanese fishing vessels operating in Bristol Bay are beginning to intercept the salmon runs of these waters. Such reports are becoming more and more insistent and reliable, and during the past season their authenticity has been supported by impressive affidavits and by actual photographs of the fishing operations in question.

"The American Government has understood from assurances given by the Japanese Government to the American Embassy at Tokyo that no licenses were being granted to Japanese fishing vessels to fish for salmon in the Bristol Bay area. Nevertheless evidence which continues to reach the American Government raises a strong presumption that

Japanese nationals have actually begun salmon fishing on a substantial scale in the waters in question. The fact of such fishing being without the authority of the Japanese Government renders it of no less concern to the affected American interests. The persistence by Japanese nationals in such fishing operations in Alaskan waters would inevitably cause, among American interests, the gravest anxiety for the future of the salmon fisheries with which is inseparably joined the employment and economic welfare of large sections of the American people.

"The American Government must also view with distinct concern the depletion of the salmon resources of Alaska. These resources have been developed and preserved primarily by steps taken by the American Government in cooperation with private interests to promote propagation and permanency of supply. But for these efforts, carried out over a period of years, and but for consistent adherence to a policy of conservation, the Alaska salmon fisheries unquestionably would not have reached anything like their present state of development.

"The laws enacted by Congress for the protection of the fisheries of Alaska have especially provided for the perpetuation of the salmon resources by requiring an escapement for breeding purposes of at least 50 per cent of the runs. To assure such escapements, the fishing laws provide for weekly closed periods and prohibit commercial salmon fishing at the mouths of all but the larger Alaska salmon streams. The Secretary of Commerce is authorized to fix the size and character of nets, boats, and other equipment used in salmon fishing, to limit the catch of fish, and to regulate the length of the fishing season. In practice the season is limited to approximately one month and fishing equipment to the simplest varieties, but Japanese nationals fishing in Bering Sea appear to be without restrictions as to season or equipment. The effect of these measures of conservation has been not only to maintain normal production from the Alaska salmon fisheries but to raise the salmon pack in recent years to the highest levels in the history of the industry. Conservation measures have also included biological surveys, the development of hatcheries, supervisory patrols, and the maintenance of special facilities for the conduct of these activities. The cost of these conservation measures to the American Government over the past ten years has averaged annually the substantial sum of \$358,000.

"The cost of the extensive efforts made by the Government to regulate salmon fishing and to perpetuate the supply of salmon has been borne by the American people, and not infrequently American fishermen have suffered loss of employment and income as a result of the various restrictions imposed. Because of such sacrifices, and the part that American citizens have played in bearing the cost of con-

serving and perpetuating the salmon resources, it is the strong conviction and thus far unchallenged view on the part of millions of American citizens on the Pacific Coast interested in the salmon industry and on the part of the American public generally that there has been established a superior interest and claim in the salmon resources of Alaska.

"Large bodies of American citizens are of the opinion that the salmon runs of Bristol Bay and elsewhere in Alaskan waters are an American resource; that the salmon fisheries relate to and are linked with the American continent, particularly the northwest area; and that for all practical purposes, the salmon industry is in fact a part of the economic life of the Pacific northwest coast. The fact that salmon taken from waters off the Alaskan coast are spawned and hatched in American inland waters, and when intercepted are returning to American waters, adds further to the conviction that there is in these resources a special and unmistakable American interest.

"The Bristol Bay red salmon spawn in the tributary rivers and lakes of the adjacent region; the young hatch and remain in their fresh water habitat for 1 or 2 years and then migrate to sea. After the seaward migration the salmon return in 2 or 3 years to their native streams where they spawn and die. It is during the spawning migration that salmon are exposed to commercial fishing, and the need for conservation measures arises.

"In the principal Alaska fishing areas, and particularly in Bristol Bay, salmon appear in runs near the surface of the water and, in large part because of the shallowness of these waters, are subject to capture chiefly after they have passed from the open ocean to the continental shelf. The continental shelf, extending for a considerable distance from shore, thus becomes a kind of bridge between the deep sea and the inland rivers and lakes where salmon spawn.

"American fishermen are aware that salmon-fishing operations can be successfully conducted in the comparatively shallow offshore area of certain Alaskan waters; and that, by using motor-powered vessels, long and deep fishing nets, and special seines, the per capita catch of salmon may be greatly increased. The prospect of the use of these more effective methods by Japanese nationals engaging in offshore fishing in Alaskan waters, while similar methods are denied to American fishermen, has provoked among American citizens expressions of serious concern and resentment. It is clear to all that if foreign nationals are permitted to carry on fishing operations off the shores of Alaska, the conservation efforts of the American Government would in a comparatively short period be completely nullified, whatever the intentions of those engaged in such fishing operations. Such an even-

tuality would be all the more deplorable for the reason that no conceivable economic gain would compensate the nationals of Japan for the probable destruction, however unintentional, of resources developed through the general efforts of American citizens.

"The economic welfare of the Pacific coast and the perpetuation of the salmon industry are peculiarly interdependent. Employees engaged in the fisheries and the capital invested in them come largely from the States of the Pacific northwest. The Alaska salmon industry in turn has been developed from a single cannery producing 12,500 cases in 1878 to an industry which in 1936 comprised 117 modern canneries, employed 25,000 persons, and packed approximately $8\frac{1}{2}$ million cases of salmon. Bristol Bay operations began with an experimental pack of 400 cases, and by 1936, 24 canneries were in operation, 8,000 persons were employed, and the salmon packed in 1936 amounted to $1\frac{1}{2}$ million cases.

"The Alaska salmon industry is not only of importance in itself but has had and continues to have a direct and important influence upon allied and related industries, in which many thousands of American citizens are employed. Shipbuilders, transportation companies, insurance companies, banks, and producers of marine supplies and fishing equipment on the Pacific coast, have predicated their investments and operating plans on the expectation of normal levels of production in the salmon industry. It is reliably estimated that the Alaska canned salmon industry as a whole annually pays to steamship companies for the handling of passengers and freight approximately \$3,500,000, pays about \$7,500,000 for canning materials, and expends roughly \$15,000,000 in taxes and for supplies incident to the operation of the salmon industry. The manufacture of supplies and equipment for the fishing industry contributes substantially to employment and industrial enterprise not only in the Pacific coast area but in widely separated regions of the country.

"The interest of the residents of Alaska in the adjacent fishing waters is also real and vital. Upon the maintenance of a prosperous salmon-fishing industry depends the entire fiscal and economic welfare of the Territory of Alaska. About 80 per cent of the public revenues are derived from the salmon-fishing industry. It is clear therefore that not only expenditures for the ordinary functions of the Government of Alaska but also funds for the maintenance of its school system and public institutions depend upon the perpetuation of the salmon resources of Alaskan waters. It is also an important fact that Alaska's trade with the United States is confined to water transportation, and the facilities upon which such intercourse is based are indirectly dependent upon the stability and prosperity of the salmon industry.

"The views hereinbefore expressed are strongly supported by Members of Congress, the Delegate to Congress from the Territory of Alaska, a large section of the American press, and business interests and residents of the Pacific coast generally.

"The American Government is confident that the Japanese Government will realize the seriousness of the problem involved in this situation and the urgency of there being taken early and effective action to dispose of it. The American Government also believes that any solution or arrangement arrived at for the protection of Alaska salmon resources should cover not only the Bristol Bay area but also include and afford protection to all principal American salmon-fishing waters adjacent to the Territory of Alaska. The emphasis which has been placed in this statement upon the situation in Bristol Bay arises from the fact that the activities of Japanese fishing vessels have been chiefly observed there; it should not be inferred for this reason that a similar situation in other Alaskan waters would be of less concern to American fishing interests.

"Having in mind the high importance of the Alaska salmon fisheries as an industry fostered and perpetuated through the efforts and economic sacrifices of the American people, the American Government believes that the safeguarding of these resources involves important principles of equity and justice. It must be taken as a sound principle of justice that an industry such as described which has been built up by the nationals of one country cannot in fairness be left to be destroyed by the nationals of other countries. The American Government believes that the right or obligation to protect the Alaska salmon fisheries is not only overwhelmingly sustained by conditions of their development and perpetuation, but that it is a matter which must be regarded as important in the comity of the nations concerned."

APPENDIX B

TABLES SHOWING PRODUCTION OF CANNED PACIFIC SALMON BY MAIN REGIONS

World Production of Canned Pacific Salmon, 1910-38

(in 48-lb. cases)

Year	Alaska	United States ¹	Canada	Siberia ²	Japan ³
1910	2,438,777	3,555,623	762,201	10,000	
1911	2,820,963	5,173,521	948,965	25,000	
1912	4,060,129	4,952,279	996,576	77,500	
1913	3,756,433	6,709,546	1,353,901	133,400	46,000
1914	4,167,832	5,533,743	1,111,039	136,500	65,450
1915	4,489,002	6,506,211	1,133,381	289,009	70,000
1916	4,919,589	6,360,547	995,065	425,800	27,849
1917	5,922,320	8,567,409	1,497,475	511,001	39,644
1918	6,677,369	8,076,143	1,616,157	381,337	35,778
1919	4,591,110	6,630,347	1,393,156	748,511	86,189
1920	4,395,509	5,101,705	1,187,616	595,771	87,516
1921	2,604,973	3,622,012	603,548	705,493	38,122
1922	4,501,355	5,231,675	1,290,326	718,184	25,894
1923	5,063,340	6,411,757	1,341,677	703,669	54,053
1924	5,305,923	6,245,320	1,745,313	799,120	60,190
1925	4,450,808	6,034,321	1,720,622	586,663	133,764
1926	6,652,882	7,401,684	2,065,108	946,188	175,084
1927	3,566,072	5,053,472	1,360,449	817,835	137,462
1928	6,070,110	6,902,447	2,035,637	482,469	197,800
1929	5,370,242	6,983,556	1,400,750	1,002,912	632,874
1930	4,988,987	6,044,093	2,221,783	752,112	378,404
1931	5,432,535	6,780,492	685,104	1,133,671	458,270
1932	5,260,458	5,914,853	1,081,031	720,876	247,251
1933	5,226,608	6,360,742	1,265,072	1,012,905	772,924
1934	7,470,586	8,361,990	1,582,926	900,641	892,570
1935	5,155,826	6,037,454	1,529,022	207,952	467,752
1936	8,454,948	8,983,217	1,881,026	689,841	198,096
1937	6,654,038	7,526,197	1,509,175	1,073,632 ⁴	1,335,172
1938	6,791,544	7,274,209	1,697,016	1,198,533 ⁴	1,113,515

¹ Including Alaska.

² Including Soviet and Japanese shore canneries.

³ Including shore plants in Japan and Japanese floating canneries on the high seas.

⁴ This only includes pack of Japanese canneries as figures for the Soviet canneries are not available for 1937 and 1938.

Source: *Pacific Fisherman*, 1937 and 1939 Yearbooks.

APPENDIX B

309

North American Production of Canned Salmon by Species, 1899-1938¹

(in 48-lb. cases)

Year	King, Spring or Chinook	Red, Sockeye or Blueback	Medium			Chum or Keta	Steel- head Trout	Total Cases
			Red	Coho	Pink			
1899	334,974	2,153,388	261,071	401,892	61,932	11,994		3,225,251
1900	338,493	2,046,908	208,026	232,022	155,208	20,597		3,001,254
1901	455,395	3,801,730	126,535	585,017	86,230	20,000		5,074,907
1902	379,641	2,702,045	227,031	549,602	313,603	8,593		4,180,515
1903	403,836	2,231,555	330,319	564,507	61,232	7,251		3,598,700
1904	444,472	1,950,949	168,235	299,333	168,235	9,868		3,041,092
1905	443,794	3,488,322	269,806	253,559	138,642	9,822		4,603,945
1906	424,974	2,122,204	397,346	416,602	450,151	6,500		3,817,777
1907	354,209	1,707,813	397,786	1,114,100	272,135	6,604		3,852,647
1908	379,171	2,186,325	386,745	726,656	303,837	11,863		3,994,597
1909	262,554	3,671,555	373,567	882,410	218,987	17,382		5,426,455
1910	372,901	2,274,780	521,966	589,043	555,908	5,576		4,320,174
1911	627,714	1,809,927	676,141	2,373,595	592,790	8,618		6,104,887
1912	426,338	2,544,435	621,817	1,556,128	808,630	7,198		5,956,953
1913	285,472	4,643,425	300,033	2,392,106	432,812	9,539		8,063,447
1914	509,100	3,121,964	579,980	1,222,013	1,200,433	11,292		6,044,782
1915	641,979	2,492,865	551,821	2,825,570	1,107,707	29,650		7,639,592
1916	646,341	2,432,048	715,815	2,036,077	1,500,332	24,999		7,355,612
1917	673,080	3,248,843	588,749	3,929,332	1,648,313	35,677		10,124,894
1918	697,140	2,987,710	838,088	2,953,245	2,175,031	41,086		9,692,300
1919	704,195	1,707,846	793,175	2,426,414	2,367,481	24,392		8,023,503
1920	705,050	1,892,691	361,566	2,138,959	1,175,001	16,054		6,289,321
1921	419,508	2,034,310	362,943	1,038,000	359,947	11,362		4,226,160
1922	353,588	2,480,811	510,919	2,241,760	908,283	26,640		6,522,001
1923	389,802	2,309,142	534,225	3,371,917	1,120,591	27,757		7,753,434
1924	406,096	1,902,832	542,682	3,295,739	1,835,251	31,270		7,990,543
1925	550,071	1,581,792	667,817	3,111,320	1,803,371	17,248		7,731,610
1926	485,788	2,550,771	607,778	4,101,422	1,762,134	36,233		9,544,126
1927	538,574	1,738,054	642,522	2,241,304	1,217,338	33,377		6,411,160
1928	354,798	2,214,498	602,203	3,583,433	2,165,652	17,492		8,938,076
1929	375,497	2,100,787	564,826	3,775,704	1,541,213	24,821		8,382,908
1930	427,282	1,710,018	758,451	4,266,301	1,085,351	18,509		8,265,912
1931	418,483	2,084,385	388,140	3,890,755	671,574	13,670		7,467,016
1932	394,698	2,482,800	445,456	2,341,817	1,310,038	14,386		6,980,195
1933	343,442	2,579,891	402,107	3,259,341	1,021,547	19,486		7,625,814
1934	352,352	3,354,863	506,921	4,261,262	1,362,995	16,183		9,944,486
1935	279,693	1,232,852	596,117	4,130,114	1,304,216	15,484		7,567,476
1936	314,195	2,968,184	533,285	5,181,954	1,846,675	20,350		10,864,643
1937	385,040	2,491,655	370,795	4,524,821	1,237,331	18,352		9,028,719
1938	234,041	3,117,421	599,710	3,621,406	1,382,520	16,127		8,971,225

¹ Entire British Columbia pack included under Sockeye prior to 1903.Source: *Pacific Fisherman*, 1939 Yearbook, p. 85.

NORTH PACIFIC FISHERIES

Canned Salmon Pack and Salmon Canneries of Alaska by Regions,
1878-1938

Year	No. of Canneries				Pack in 48-lb. Cases			
	South-eastern	Central	Western	Total Alaska	South-eastern	Central	Western	Total Alaska
1878.....	2	..	..	2	8,159	..	..	8,159
1879.....	2	..	..	2	12,530	..	..	12,530
1880.....	1	..	..	1	6,539	..	..	6,539
1881.....	1	..	..	1	8,977	..	..	8,977
1882.....	1	2	..	3	11,501	10,244	..	21,745
1883.....	4	2	..	6	20,040	28,297	..	48,337
1884.....	4	2	1	7	22,180	42,207	400	64,886
1885.....	3	2	1	6	16,728	52,687	14,000	83,415
1886.....	4	2	3	9	18,060	74,583	48,812	142,065
1887.....	5	2	3	10	31,462	102,515	74,700	206,677
1888.....	6	4	..	10	81,128	241,101	69,886	412,115
1889.....	12	21	4	37	141,760	461,451	115,085	719,196
1890.....	12	19	4	35	142,901	421,300	118,300	682,510
1891.....	11	14	5	30	156,615	511,307	133,418	801,400
1892.....	7	6	2	15	115,722	205,406	63,499	474,717
1893.....	8	11	3	22	136,053	399,815	107,786	643,654
1894.....	7	10	4	21	142,544	435,052	108,844	686,440
1895.....	7	10	6	23	148,470	327,010	150,135	626,530
1896.....	9	12	8	29	262,381	485,090	218,336	966,707
1897.....	9	13	7	29	271,867	382,809	254,312	809,078
1898.....	9	14	7	30	251,385	305,000	318,703	905,097
1899.....	16	14	12	42	310,210	350,005	411,832	1,078,146
1900.....	21	13	21	55	456,030	492,223	599,277	1,548,139
1901.....	26	12	26	64	735,449	562,142	719,213	2,010,804
1902.....	21	12	27	60	966,676	583,690	1,046,458	2,530,824
1903.....	12	11	32	55	642,305	417,175	1,186,730	2,240,210
1904.....	13	9	25	47	569,003	499,495	885,268	1,953,756
1905.....	20	8	19	47	433,607	371,755	1,080,154	1,804,516
1906.....	22	8	18	48	705,230	473,024	978,735	2,246,080
1907.....	23	8	19	50	910,730	522,830	750,534	2,202,100
1908.....	19	8	18	45	1,022,723	425,721	1,160,604	2,618,048
1909.....	23	10	10	52	860,310	391,054	1,151,296	2,493,669
1910.....	32	11	21	64	1,001,385	432,517	914,138	2,428,777
1911.....	51	14	22	87	1,601,838	471,986	747,139	2,820,963
1912.....	42	14	23	70	2,030,777	622,800	1,307,543	4,060,120
1913.....	45	14	23	82	1,863,851	447,267	1,505,315	3,756,433
1914.....	46	17	23	86	1,869,031	656,504	1,622,207	4,107,832
1915.....	54	19	27	100	2,233,658	1,085,719	1,610,212	4,919,589
1916.....	60	20	20	113	3,284,408	1,005,945	1,631,067	5,922,320
1917.....	75	29	30	134	3,385,540	1,404,238	1,887,591	6,777,360
1918.....	75	30	28	133	3,108,364	775,466	707,280	4,501,110
1919.....	80	35	28	143	2,202,276	1,279,755	913,478	4,395,509
1920.....	30	27	27	84	804,103	659,271	1,141,509	2,604,973
1921.....	57	36	28	121	1,904,679	1,932,455	1,474,221	4,501,355
1922.....	67	39	30	136	3,014,067	756,303	1,202,010	5,063,340
1923.....	65	38	31	134	2,707,166	1,607,920	890,837	5,305,923
1924.....	62	37	30	120	2,705,611	1,054,875	600,493	4,450,808
1925.....	61	43	28	132	3,058,055	2,140,485	1,448,342	6,652,882
1926.....	62	47	29	138	1,045,823	1,587,788	932,401	3,506,072
1927.....	60	62	29	151	2,902,197	1,638,872	1,460,641	6,070,110
1928.....	59	70	30	159	2,008,017	2,088,544	1,183,081	5,370,242
1929.....	57	68	27	152	2,903,304	1,594,030	431,647	4,988,987
1930.....	41	49	25	115	2,507,865	1,681,609	1,183,001	5,432,535
1931.....	31	34	22	87	2,214,660	1,618,772	1,427,047	5,260,488
1932.....	38	31	23	92	2,088,358	1,485,927	1,652,413	5,226,068
1933.....	47	45	22	114	3,205,618	2,315,697	1,850,271	7,470,586
1934.....	46	44	9	99	3,003,028	1,809,700	283,008	5,155,826
1935.....	46	46	24	116	4,121,908	2,846,212	1,486,828	8,454,948
1936.....	45	47	24	116	2,924,104	2,209,744	1,520,100	6,654,038
1937.....	39	43	17	98	2,706,733	2,170,165	1,914,646	6,791,544

Source: *Pacific Fisherman*, 1930 Yearbook, p. 79; for 1878 figures see John N. Cobb, *Pacific Salmon Fisheries*, U.S. Dept. of Commerce, Bureau of Fisheries, Fisheries Document no. 1092 (Washington, 1930), p. 572.

APPENDIX B

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United States Coastal Production of Canned Salmon, 1864-1938

Year	Puget Sound	Northern Washington Coast	Willapa Harbor	Columbia River	Coastal Streams of Oregon	Northern California Coast	Sacramento-Monterey District
1864	..	..	..	..	..	..	..
1865	..	..	..	4,000	..	..	2,000
1866	..	..	..	18,000	..	..	2,000
1867	..	..	..	28,000	..	..	..
1868	..	..	..	100,000	..	..	..
1869	..	..	..	150,000	..	..	..
1870	..	..	..	200,000	..	..	..
1871	..	..	..	250,000	..	..	..
1872	..	..	..	250,000	..	..	..
1873	..	..	..	350,000	..	..	..
1874	..	..	..	375,000	..	..	2,500
1875	..	..	..	450,000	..	..	3,000
1876	..	..	..	380,000	7,804	8,500	10,000
1877	5,500	..	..	460,000	26,934	14,777	21,500
1878	238	..	..	480,000	8,571	..	13,855
1879	1,300	..	..	530,000	7,772	13,750	62,000
1880	5,100	..	..	550,000	12,320	..	181,200
1881	8,500	..	..	541,300	19,180	..	200,000
1882	7,900	..	..	620,400	21,156	15,000	123,000
1883	1,500	..	..	620,000	27,876	13,700	81,450
1884	5,500	..	..	553,800	33,410	7,300	90,000
1885	12,000	..	..	448,500	77,547	12,500	30,300
1886	17,000	..	13,600	309,885	73,996	..	36,500
1888	22,000	..	..	372,477	92,803	6,747	68,075
1889	21,975	..	22,500	435,774	47,009	..	57,300
1890	11,674	..	..	398,953	24,590	..	25,065
1891	8,000	..	..	400,100	82,041	1,047	10,353
1892	20,529	..	8,000	487,338	83,600	1,047	2,281
1893	26,426	..	14,500	312,774	52,778	3,600	23,336
1894	89,774	..	10,195	415,876	..	..	..
1895	95,400	..	15,100	490,100	54,815	3,700	28,463
1896	170,968	..	22,600	634,606	77,878	3,850	25,185
1897	195,664	21,274	24,941	481,697	87,360	..	13,387
1898	404,026	13,300	29,000	552,721	60,158	..	38,543
1899	400,200	12,100	21,420	487,944	75,679	..	29,731
1900	469,450	30,800	20,300	358,772	12,237	1,600	32,580
1901	1,380,500	41,500	34,000	390,183	56,018	..	39,304
1902	581,650	31,500	39,492	317,143	44,236	2,500	14,043
1903	478,488	..	5,890	339,577	54,801	..	8,200
1904	291,488	27,559	26,400	395,104	98,874	3,400	14,407
1905	1,018,641	22,050	14,950	397,273	89,055	..	2,780
1906	430,602	22,000	14,440	394,808	197,332	..	..
1907	698,080	14,000	13,382	324,171	79,712	..	..
1908	448,705	14,000	20,457	253,341	52,478	..	..
1909	1,032,949	19,787	12,024	274,087	58,169	5,633	..
1910	567,883	51,130	14,508	301,415	103,617	14,016	..
1911	1,557,029	61,671	25,850	543,331	154,828	7,604	4,142
1912	416,125	54,507	24,887	285,666	77,705	33,200	..
1913	2,583,403	54,022	8,422	266,479	42,441	6,376	950
1914	792,860	54,100	15,702	455,500	116,335	14,000	17,315
1915	1,260,206	22,727	12,842	558,534	80,499	15,933	7,129
1916	707,278	55,092	17,506	547,605	81,643	11,389	19,445
1917	1,921,554	41,196	8,139	555,218	84,099	14,330	11,443
1918	624,108	57,015	8,387	501,381	92,457	21,100	4,036
1919	1,295,620	56,882	6,560	580,028	76,284	19,597	3,169
1920	160,520	1,527	60	481,545	35,061	20,028	427
1921	653,490	9,562	5,216	323,241	15,754	10,376	..
1922	248,729	50,608	2,749	392,174	26,287	9,700	..
1923	758,138	47,334	8,000	480,025	47,411	6,000	..
1924	317,649	30,782	15,755	500,872	61,403	12,936	..
1925	911,670	36,659	16,617	540,452	55,686	22,339	..
1926	310,425	14,501	11,210	479,723	31,001	11,537	..
1927	802,244	19,350	17,531	519,809	48,610	15,585	..
1928	325,370	20,496	16,535	446,646	19,047	4,237	..
1929	1,131,844	24,583	16,936	422,117	15,060	2,774	..
1930	572,606	28,907	6,684	429,505	12,233	5,771	..
1931	948,881	20,263	..	353,099	12,834	12,286	..
1932	310,911	37,950	..	290,191	8,524	780	..
1933	771,776	14,202	1,556	336,711	7,050	2,149	..
1934	500,093	20,005	2,485	302,721	6,100	..	..
1935	516,727	27,262	..	332,739	4,000	..	..
1936	182,561	19,763	..	316,445	9,500	..	..
1937	441,874	11,055	..	416,830	2,400	..	..
1938	159,943	14,732	..	307,090	..	..	..

Source: John N. Cobb, *Pacific Salmon Fisheries*, U.S. Dept. of Commerce, Bureau of Fisheries, Document no. 1092 (Washington, 1930), pp. 553-55; *Pacific Fisherman*, 1937 Yearbook Number, p. 87; *Pacific Fisherman*, 1938 Yearbook Number, p. 67; *Pacific Fisherman*, 1939 Yearbook pp. 67, 83.

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